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DENVER, COLORADO 80225

Memorandum

February 28, 1978

To: Strategic Plan Field Advisory Committee Members

From: Socio-Economic DRD Core Team Leader

Subject: Centaur Management Consultants, Inc., Infrastructure Report

Tasks 1, 2 and 3 of the Socio-Economic DRD involved defining data elements for five subject areas (Economics, Social Demography, Public Participation, Bureau Relationships, and Infrastructure). Through the issuance of a component contract, the infrastructure position was completed by Centaur Management Consultants, Inc. The final report was intended not only to accomplish the task of defining the necessary infrastructure data elements, but also to provide a stand-alone document to assist BLM personnel in the preparation of planning documents.

For DRD purposes, the size of the Infrastructure Report has been modified, but the report in its original form is enclosed for your information and use as you see fit. Please caution users that the document is for reference only.

Enclosure

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Contract: YA-512-CT7-42
Task Order: YA-510-PH8-3

INFRASTRUCTURE SYSTEMS: A COMPONENT OF THE BUREAU OF LAND MANAGEMENT STRATEGIC INFORMATION PLAN

DECEMBER, 1977

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Centaur Management Consultants, Inc.

Centaur Management Consultants, Inc.

Suite 465
1120 Connecticut Avenue, N.W.
Washington, D.C. 20036
202/296 4100

December 9, 1977

RECEIVED
Bur of Land Management
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Bureau of Land Management
Denver Federal Center
Building 50
Denver, Colorado 80225

Attention: Keith Pearson

Subject: Final Report
Infrastructure System Task Order, Contract Number YA-512-CT7-42
Task Order YA-510-PH8-3

Dear Dr. Pearson:

The attached represents the changes in the Draft Report (December 2) in response to both your and Michael McNeil's comments.

In addition to typographical and editorial changes there are three additions to the Draft Report. The first is a bibliography which lists references containing standards, guidelines, or other relevant information for assessing performance of a particular system. We have been selective in compiling this list, including only those references which are commonly used. Design standards have not been included because we assumed that they are implicit in any permit or license procedure which may exist. As we have discussed, these references are often general guides and in many cases local historical trends will be a more meaningful tool. The second addition is a notation on the IPO charts to identify those inputs for which location specific information is required. Third, is a notation also on the IPO charts, for inputs for which "age" may be useful. Age can be used in assessing adequacy, and in identifying the possibility for capital expenditures. However, because it is impossible to generalize from the age of a facility, it is supplied only as a tool, and not to form the basis for a rule on the adequacy of facilities or equipment.

Other changes have been made to reflect comments. In making these changes we have attempted to maintain a level of detail which is commensurate with the responsibilities of a BLM planner, recognizing that addition information and analysis will be required in any specific site.

This attachment constitutes our Final Report. If you have any questions please contact us.

Sincerely,

Isabel Reiff

Isabel Reiff

cc: Daniel Sedlock
Bureau of Land Management
Contracting Officer, D-512
Building 50, Denver Federal Center
Denver, Colorado 80225

cc w/attachment: Michael McNeil
WO-220
BLM, Environmental and Planning Staff
Suite 412
1120 20th Street
Washington, D.C. 20036

PREFACE

As part of its multiple use planning responsibilities, the Bureau of Land Management is developing a comprehensive and integrated information system. The program in which this system will be developed is called the Strategic Information Plan (SIP). A major part of the SIP is preparation of a socioeconomic "Detailed Requirements Definition" procedure. There are four parts to the socioeconomic DRD: Social Demography, Economics, Public Participation and Infrastructure. This project identifies the data categories and elements required to analyze impacts of BLM resource program activities on local infrastructure systems. In addition, it provides, for each infrastructure system, a brief discussion and a list of key questions for analyzing possible infrastructure impacts. This support material should assist the BLM planner in understanding the uses and limitations of the data categories presented.

This project was directed by Isabel Reiff of Centaur Management Consultants, Inc. with the assistance of Kathy Brown, Barbara Castle, John Duberg, Paul Kolp, Andrew McWilliams, Andrew Preziosi, and Carl Silsbee. The project was undertaken under the guidance of the Planning and Environmental Coordination staffs of the Bureau of Land Management, Department of the Interior.

Michael L. Frankel
Centaur Management Consultants, Inc.

TABLE OF CONTENTS

PAGE

PREFACE

INTRODUCTION

I. COMMUNICATIONS.................... 1

II. EDUCATION.................... 8

III. ENERGY SERVICES.................... 27

IV. FIRE PROTECTION.................... 41

V. FISCAL BASE.................... 55

VI. GOVERNMENT.................... 65

VII. HEALTH CARE.................... 79

VIII. LAW ENFORCEMENT.................... 106

IX. PUBLIC HOUSING.................... 125

X. RECREATION.................... 135

XI. SEARCH AND RESCUE.................... 149

XII. SOCIAL SERVICES.................... 156

XIII. SOLID WASTE.................... 174

XIV. STORM-WATER RUNOFF.................... 185

XV. TRANSPORTATION.................... 196

XVI. WASTEWATER TREATMENT.................... 209

XVII. WATER SUPPLY.................... 218

XVIII. BIBLIOGRAPHY.................... 233

INTRODUCTION

I. Background

This project provides a framework for identifying the information to analyze the effect of Bureau of Land Management actions on local infrastructure systems. These systems include the range of primarily public activities which support an area's social and economic structure. For the purpose of this project these systems include: Communications, Education, Energy Services, Fire Protection, Fiscal Base, Government, Health Care, Law Enforcement, Public Housing, Recreation, Search and Rescue, Social Services, Solid Waste, Storm-Water Runoff, Transportation, Wastewater Treatment and Water Supply.

The project is part of a larger effort by the Bureau to develop a comprehensive and integrated information system. This system will support BLM resource program activities, including Lands, Minerals, Forest Products, Range Management, Watershed, Wildlife, and Recreation.

Information about infrastructure systems are an integral part of the planning and analysis guidance issued by the Bureau. This guidance is incorporated in BLM Manuals 1606 (Social and Economic Profile), 1607 (Planning Area Analysis), 1791 (Environmental Analysis), and 1792 (Environmental Statements). Local infrastructure systems are a consideration in Bureau planning activities for two main reasons. First, BLM actions may result in a change in the population or economic characteristics of an area. These changes will, in turn, be reflected in the demand for, and quality of public and private services (e.g., Transportation) as well as the community's organizational and financial capacity to deal with these changes. BLM-related population and economic changes may occur separately: one community may experience the population growth and associated demand for services, while a disproportionate share of the economic benefits needed to provide these services may go to another jurisdiction not experiencing such increases in the demand for services. Second, certain BLM actions may require support from systems (e.g., Search and Rescue) in neighboring areas. The presence of such support may be critical to the feasibility of the BLM action. Third, a BLM action may directly affect a community resource (e.g., aquifer recharge area, recreation area, etc.).

In addition to the definition of data categories and elements, this document includes support material in the form of planning and decision-making questions and technical narratives. These materials place the information into a context which clarifies the purpose behind each item of information. In this way the document can provide guidance in assessing infrastructure impacts before the entire system is implemented.

II. Limitations

In using this document it is important to recognize that it is not a planning process. Further it does not actually equip the BLM planner to either inventory every community facility or service or to implement actions (e.g., construction,

hiring, equipment purchases) to remedy potential infrastructure problems. Rather, it is a compilation of types of information necessary for identifying potential infrastructure problem areas.

In order to design an information system, it is necessary to be able to both define the variables that describe how it functions, and to be able to collect data about them. For social systems, of which infrastructure is a part, this is a very complicated task. As soon as one moves beyond a description of the physical elements of the system (e.g., hospital beds, buses, pipes) and into questions of capacity, quality, and demand, the variables which are important become considerably more obscure and difficult to quantify. In many cases surrogates have to be used because actual data is not available. Further, for many of the systems it is impossible to establish valid comparisons between different communities or jurisdictions, or even between diffferent groups within a single county. Finally, because local expectations play such an important part in determining the demand for services and the level at which they are used, federal standards become of limited use in assessing quality.

For these reasons, it is important that the information system be seen as a planning tool rather than the planning or analysis itself. This limitation is particularly obvious for social services. The significant information in describing the social service system cannot be manipulated into a series of equations which will describe the quality and adequacy of the services. What the system can do is to provide indicators of potential problem areas.

Probably the most difficult variables to quantify or describe are those relating to human lifestyles, i.e., people's perceptions of local infrastructure services and their relative importance in their lives. The impact of BLM actions on human perceptions and lifestyles is important to assess. Like the community's fiscal base, it provides a framework for analyzing a wide range of infrastructure services in terms of a common denominator. For example, while both local roads and solid waste disposal facilities might be deficient according to published guidelines, an attitude survey which reveals that people's dissatisfaction is greater with the roads than waste disposal has important implications for planners. The analyst should refer to any published attitudinal surveys of a given locality which exist, and may wish to supplement any such surveys by contacts with local opinion leaders (e.g., politicians, journalists) or even formal public opinion surveys of the subject community. Seldom does an indication of a deterioration in quality mandate a particular public decision or action. Ultimately such decisions will have to be made in the context of local priorities and conflicting pressures.

The document is organized according to the seventeen categories identified above. Each category includes:

- Definitions of infrastructure systems categories and subcategories;

- Technical narratives describing the analysis procedures;
- Questions which describe the planning and decision-making process surrounding the infrastructure analysis;
- Input-Process-Output charts which list the data elements and procedures required to arrive at outputs.

In addition, at the end is a bibliography of references containing standards and guidelines which may be applicable in assessing the quality of a system.

III. Definitions of Categories, Subcategories and Elements

The various systems which comprise an area's infrastructure have been defined functionally. In determining which systems to include the following items have been considered:

- The areas in which BLM actions will have their most significant effect on infrastructure are non-metropolitan areas. This is in part due to the type of resource management activities for which BLM has responsibility and also because larger, urbanized areas can often absorb the incremental effects of these types of actions. For these reasons, the definitions of categories reflect a view of the systems as they operate in non-metropolitan areas. However, where significant qualitative differences exist between metropolitan and non-metropolitan areas, these are noted in the technical narratives under the heading "assumptions."
- The focus of this effort has been on infrastructure systems which are primarily publicly financed and operated. Accordingly, housing and commercial services, although part of the total infrastructure system of an area, have not been included. For those categories in which there are private operations (i.e., contracted for by a municipality or a commercial profit or nonprofit operation) which will have a considerable bearing on the demand for the public system (e.g., education, health care, solid waste management), these private operations are included.

Subcategories have been defined for those instances in which several distinct but related functions are performed (e.g., Technical Education, Primary Education, etc.). In two places the definition of subcategories is not functional. These are Medical Personnel in Health Care, and Building Space in Government.

Within each category and subcategory the elements which actually comprise the system have been defined. Often, the identification of elements has been restricted to those which are necessary to assess adequacy or for which there are standards. Information describing and measuring these elements is a major input to the information system. For this reason, the unit in which the element

is measured (e.g., square feet, dollars per year), is also identified. In most cases, elements include personnel, facilities and equipment. However, fiscal information (e.g., capital and operating budgets), and other ways of measuring the system (e.g., bus routes) are included as appropriate.

IV. Technical Narratives

A narrative has been prepared for each category which sets forth the technical approach, assumptions and any standards which may apply to its evaluation. Because there are so many differences between categories, these narratives are necessary as thorough explications of the information presented in describing the system. The technical narratives are also important in describing elements of the subsequent analysis for which the data will be used. In some instances, analysis required in one category will rely on information collected in other parts of the infrastructure system or other components of the system.

The technical approach includes consideration of how capacity and demand are measured, the reasons for the way the categories have been defined and the potential relationship of BLM actions to the infrastructure category. In some instances demand may be directly related to a specific variable (e.g., demand for wastewater treatment and households), whereas in other instances the relationships will be much less clear (e.g., demand for counseling services and income levels). The assumptions discuss how the non-metropolitan and public perspective affect the definitions and what has been included. The discussion of standards describes any averages or guidelines which may be of use in assessing the quality of the services. In many cases comparisons with similar communities or previous local conditions will make more sense in assessing change than will national standards.

V. Questions

Questions have been prepared for each category (and in some cases, for each subcategory). These questions serve two purposes. First, they illustrate the types of concerns facing a planner in assessing the implications of a BLM action. As such they provide the logic behind the information contained in the IPO chart. Second, they provide a check on the information in the IPO chart. Rather than examining each entry on the IPO chart for completeness, by determining whether the questions represent the range of concerns, and knowing that there is adequate information in the chart to answer the questions they serve as a check.

VI. Input-Process-Output Charts

The IPO charts contain the following items:

- Information categories for the inputs and outputs of the system;

- Processes by which inputs can be manipulated to produce the desired outputs;

- Identification of the jurisdictional or geographic level at which data is collected or the need for location-specific information. In those cases where the lowest level jurisdiction is listed as city, town, or municipality, data will also be collected from the county for unincorporated areas;

- References to specific sources or types of sources from which data is available.

The IPO charts list categories for which information will be collected. As such, it is not necessary to differentiate between data collected at various points in time unless there is something qualitatively different about the data. For example, if figures on the numbers of children between the ages of 6 and 11 is an input in an Education IPO, that data element and its relation to demand for classrooms, will be valid regardless of the year for which data is entered. In some cases the number of facilities will be defined as the number of existing facilities plus the number of planned facilities minus those that are obsolete, substandard or going out of service. Alternatively, in the category of Social Services, it is important to distinguish characteristics of the current population from those of the incoming population because it is those differences, themselves, which may result in a demand for services. Accordingly, the Social Services IPO includes entries such as "current" and "new," where "new" refers to increased population associated with a BLM action. Some inputs are coded with an "a". This means that the age of the facility or equipment should also be an input into the system. Age can be an indication of the quality of the facility or of its ability to accommodate modern equipment. In some cases it can be a sign that there has been (or may be in the future) a capital outlay. However, age is only a very superficial piece of information and should not substitute for more detailed analysis of adequacy. Some inputs are also coded with an "*". This indicates the need to provide location specific information. In those cases where travel time or accessibility are important features (e.g., hospitals), mapping of facilities will be important.

There are three kinds of inputs: descriptions of the infrastructure systems; variables which cause or indicate a change in demand or level of service; and standards, guidelines, averages or other necessary means of assessing the impact of the change. Inputs describing the infrastructure systems include buildings, personnel, equipment, or other components which can be measured (e.g., number of ambulances) or listed (e.g., laws or regulations).

The variables which cause or indicate a change are primarily population and economic characteristics. The specific characteristic or the magnitude of impact may vary according to the different BLM resource management activities. In nearly all cases, however, BLM resource management activities

will have a measurable local impact on infrastructure systems through the number and characteristics (e.g., age, sex) of the population, the economy (e.g., income levels) and the land uses (e.g., mix of commercial, residential, agricultural land, density, etc.). Standards and averages, etc., are described in terms of ratios (e.g., physicians per 1,000 population), or ratings (e.g., fire insurance ratings).

Outputs list those categories in a form useful to the analyst. In some cases, these are the same as the input (e.g., number of children between 6 and 11 years of age). In others they may be computed from a combination of inputs. The process column displays the relationship between inputs in order to derive a specific output. For example, a process may be to divide the number of children between the ages of 6 and 11 by the number of primary school teachers to derive the pupil-teacher ratio. Another process may be identifying whether a local number is greater or less than a suggested standard in order to derive its relationship to a standard. Each IPO, or data category (where there are differences within an IPO) identifies the smallest geographic unit for which data should be collected. In some cases a specific mapping of facilities (e.g., pipes) is important, while in others (e.g., electric generating facilities), a larger, more regional perspective is appropriate.

Each IPO contains references to sources of data for each of the inputs. These sources fall into five main categories. The first is secondary sources in the form of books, government publications, etc., which contain either data about the type of infrastructure (e.g., national publications with data on medical personnel) or contain standards and guidelines. The second is primary contacts with representatives of companies (e.g., utilities) or governments (e.g., school superintendents) to obtain information which may not be available in published form (e.g., expansion plans). In rural areas, particularly where large or rapid growth has not occurred, such contacts will be a major source of information. The third category consists of local documents such as budgets, plans, ordinances, etc. Fourth are actual field surveys (e.g., solid waste surveys) which may have to be conducted to compensate for data deficiencies. The analyst will determine the need for such a survey based on the importance of the data element, the need for accuracy, the cost of collection, and the availability and adequacy of substitutes (e.g., average rates of household generation of solid waste). Finally, outputs from other parts of the information system will be used as inputs to the Infrastructure Component. Most of the population and economic data required for Infrastructure analysis will be collected and processed in the Social Demography and Economics Components into a form useful to Infrastructure. For example, if the demand for classrooms depends upon an age breakdown of population, it is assumed that information to compute such a breakdown based on migration, birth rates, new development, etc., will be entered into the system through the Social Demography or Economics Component. In certain cases, outputs will come from other parts of the Infrastructure analysis as well. For example, in order to perform the fiscal analysis operating expenditures are required as an output from each of the other categories. Sources are referenced to the left of the input column on the IPO charts. Where an input is listed more than once, after the first time, the source is listed as a system output. The first time, it is noted as either system output or the "original" source. For this reason, it is important to have an understanding of the system as a whole.

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I. COMMUNICATIONS

CATEGORY: COMMUNICATIONS

Communications is the transfer of information by electronic means either by electro-magnetic waves or by electrical signal. This transfer can be one-way, where one party transmits and the other receives information; or two-way, where both parties transmit and receive information.

Subcategory: Microwave Systems

Two-way communications systems utilizing microwaves as the means of transmission. Physical facilities include transmitters, relay stations, and receivers. Microwave communication usually involves the transfer of telephone messages or computer information.

- transmitters	(number and location)
- relay stations	(number and location)
- receivers	(number and location)

Subcategory: Long Line Systems

One- or two-way communications systems utilizing electrical signals carried via cable as the means of transmission. Physical facilities include transmitters, transmission cable, relay stations, receivers. Information transferred primarily include telephone calls and computer information.

- transmitters	(number and location)
- transmission cable	(location)
- relay stations	(number and location)
- receivers	(number and location)

CATEGORY: COMMUNICATIONS

Subcategory: Microwave Systems

1. Where are existing microwave transmitters located?
2. Where would proposed microwave transmitters be located?
3. Where are existing microwave relay stations (towers) located?
4. Where would proposed microwave relay stations (towers) be located?
5. Where are existing microwave receivers located?
6. Where would proposed microwave receivers be located?

Subcategory: Long Line Systems

1. Where are existing long line transmitters located?
2. Where would proposed long line transmitters be located?
3. Where are existing long line transmission cables (trunks lines and high capacity coaxial lines) located?
4. Where would proposed long line transmission cables (trunk lines and high capacity coaxial lines) be located?
5. Where are existing long line relay stations located?
6. Where would proposed long line relay stations be located?
7. Where are existing long line receivers located?
8. Where would proposed long line receivers be located?

COMMUNICATIONS

I. General Approach

Communications for purposes of this analysis refers to the long distance electronic transfer of information transmitted by means of microwaves or electrical signals carried by cable. Information thus transferred is primarily composed of telephone messages and computer information, but can also include television programming. Local communications are excluded from this definition. While local phone service will be affected by any net population increase resulting from BLM actions, this service would be provided by the local phone company. BLM would be expected to play no role in planning for or delivering such services. For the same basic reason, broadcast and print communications -- television, radio, and newspapers -- have not been treated. While BLM may want to use these media for public service announcements or public notices, the agency should play no part in delivery of these communication services.

In defining physical communications systems, subcategories have been determined by the transmission medium utilized. That is, microwave communications systems employ microwaves[1] relayed from point to point to transmit information while long line systems use electrical signals carried in cables. These two types of systems have distinct physical facilities. Microwave systems transmit information between relay stations physically separated by distances averaging from 20 to 30 miles. Long line systems transmit by cable and thus physically span the distance between transmitter and receiver.

The IPO charts for this category describe these systems in terms of the most major facilities without further subdividing these components. The rationale for this is twofold: 1) the potential for BLM involvement with or impact on communications systems is limited, 2) the use of major components allows for manageable collection of information.

The potential for BLM actions affecting long distance communications systems in terms of generating significant demand in proportion to system capacity is small. Unlike markets for water, sewer, or housing services, which are defined by relatively small physical areas, markets for long distance communications are defined by regional, interstate and/or national markets. Consequently, any increased demand in the affected area represents at most a minor increase in demand in relation to the affected communications market.

---

[1] Microwaves are a type of elctromagnetic wave with the wavelength ranging from 100 centimeters to one centimeter.

A telecommunications system may, however, act as a constraint on proposed land uses which would physically conflict with the operation of the telecommunications systems. The clearest case of conflict would occur where a buried cable crosses land which is to be developed for strip mining of coal. If no measures were taken to safeguard the buried cable, then the cable could be severed and communications disrupted. Should BLM actions require the relocation of telecommunications facilities, the impact on the facility operators would be severe. (One microwave relay station can cost up to $1.0 million and buried transmission cable can cost up to $150,000 per mile.)[1] Not only are facility costs high, but relocation of facilities in one area may necessitate adjustments in facilities over a much larger area. The amount of time required to plan for the installation of new facilities can vary from one to three years, further complicating any impact.

There is, however, virtually no chance that such a major impact would result. To date, according to an American Telephone and Telegraph Company official, BLM actions have not necessitated any relocation of communication facilities requiring significant capital expenditure.

For the purposes of this project, communications systems can be considered rights-of-way which should be mapped to determine whether they intrude on lands affected by BLM actions. If there are intrusions then consultations should be made with the operators of the communications systems to determine whether adverse impacts result.

II. Assumptions

Telecommunication facilities are correlated with population and population densities. Thus, in non-metropolitan areas affected by BLM actions there would be a lesser number of such facilities.

With the exception of telecommunications systems operated by the federal government, primarily military systems, these systems are operated by private corporations -- telephone and telecommunications companies and television stations. These corporations own, operate, and maintain the communications systems. Public involvement in the systems is via regulation by the Federal Communications Commission and state regulatory agencies. Because the chief role in providing telecommunications services is played by private industry, BLM's role is largely restricted to advising the facility operators of proposed actions which might affect their facilities. Facility operators would then be responsible for developing plans in response to proposed BLM actions.

---

[1] Cost estimates provided by American Telephone and Telegraph Company.

The relevant geographic area for describing telecommunications facilities will be no smaller than the county or multi-county level. Because telecommunications systems are interdependent impacts on one component of a system relate to the entire system that may encompass a multi-state area. Potentially impacted facilities would need to be described graphically with mapping. These facilities would then have to be seen in the context of the larger system of which they are components.

The existing telecommunications facilities should be described and mapped. The time factor is important only for proposed facilities. Planning for telecommunications facilities can take up to one year for cable and up to three years for microwave towers. These planned facilities should also be described and mapped.

III. Standards

The major question with which the BLM analyst will be concerned is that of whether existing or proposed facilities physically conflict with proposed BLM actions. Standards which define adequacy or capacity of service do not apply to the question of potential conflicts between BLM actions and telecommunications facilities.

COMMUNICATION: Microwave and Long Line Systems

Geographic Area: County
* indicates the necessity to locate on a map.

Source Number	INPUT	PROCESS	OUTPUT
1	Location of microwave transmitters	* →	Location of microwave transmitters
1	Location of microwave relay stations (towers)	* →	Location of microwave relay stations (towers)
1	Location of microwave receivers	* →	Location of microwave receivers
1	Location of long line transmitters	* →	Location of long line transmitters
1	Location of long line transmission cable (trunk lines, high capacity coaxial lines)	* →	Location of long line transmission cable (trunk lines, high capacity coaxial lines)
1	Location of long line relay stations	* →	Location of long line relay stations
1	Location of long line receivers	* →	Location of long line receivers

COMMUNICATIONS: Microwave and Long Line Systems

Sources

1. Local sources (telephone companies, telecommunication companies, television stations), state sources (state regulatory agency -- e.g., state public services commission), or BLM land use surveys.

II. EDUCATION

CATEGORY: EDUCATION

Formal courses of instruction (academic, vocational, or personal improvement) which are open to the public, either on a tax-supported basis or upon payment of a designated fee.

Subcategory: Primary Education

Primary education comprises courses offered on the kindergarten through eighth grade levels.

- school buildings	(student capacity)
- teachers	(number)
- school hours	(number of shifts) (hours per shift)
- operating budget	(dollars per year)
- capital budget	(dollars per year)

Subcategory: Secondary (Academic) Education

Secondary (academic) education encompasses courses offered in the ninth through twelfth grades, leading to a high school diploma, where emphasis is placed on academic as opposed to technical/vocational course offerings.

- school buildings	(student capacity)
- teachers	(number)
- school hours	(number of shifts) (hours per shift)
- operating budget	(dollars per year)
- capital budget	(dollars per year)

Subcategory: Secondary (Technical/Vocational) Education

Secondary (technical/vocational) education comprises course offerings on the ninth through twelfth grade level leading to the high school diploma, but where greater stress is placed on technical and vocational than academic subjects.

- teachers	(number)
- school buildings	(student capacity)
- school hours	(number of shifts) (hours per shift)
- operating budget	(dollars per year)
- capital budget	(dollars per year)

CATEGORY: EDUCATION (cont.)

Subcategory: Postsecondary Education

Courses of study normally offered only to secondary-school graduates and leading, successively, to an Associates', Bachelor's, Master's, and Doctoral degrees.

- buildings	(student capacity)
- teachers	(number) (number of types)
- operating budget	(dollars per year)
- capital budget	(dollars per year)

Subcategory: Special Education

Education, in separate schools or classrooms, of children suffering from a learning impairment sufficiently severe to prevent their inclusion in normal school classes.

- school building/classrooms	(student capacity)
- teachers	(number) (types)
- operating budget	(dollars per year)
- capital budget	(dollars per year)

Subcategory: Public Libraries

A facility providing for the storage, acquisition and dissemination of books and periodicals.

- books	(number of volumes)
- librarians	(number of employees)
- reader seats	(seating capacity)
- shelf space	(linear feet)
- stack area	(square feet)
- total floor space.	(square feet)
- operating budget	(dollars per year)
- capital budget	(dollars per year)

Subcategory: School Transportation

Publicly provided bus transportation for students going to and coming from school.

- buses	(number)

CATEGORY: EDUCATION

Subcategory: Primary, Secondary (Academic), Secondary (Technical/Vocational), Special Education, School Transportation

1. What is the current total number of public school students?
2. How many primary-age (i.e., 4 - 13 years) children are there?
3. How many primary-age children attend public primary schools?
4. How many primary-age children attend public special schools?
5. How many secondary-age (i.e., 14 - 17 years) children are there?
6. How many secondary-age children attend public secondary academic schools?
7. How many secondary-age children attend public secondary technical/vocational schools?
8. How many secondary-age children attend public special schools?
9. What is the building capacity (i.e., number of students) of the district's primary schools?
10. What is the building capacity (i.e., number of students) of the district's special schools?
11. What is the building capacity (i.e., number of students) of the district's secondary academic schools?
12. What is the building capacity (i.e., number of students) of the district's secondary technical/vocational schools?
13. What is the number/length of student shifts in the primary schools?
14. What is the number/length of student shifts in the special schools?
15. What is the number/length of student shifts in the secondary academic schools?
16. What is the number/length of student shifts in the secondary technical/vocational schools?
17. How many teachers (full-time equivalent) does the district employ?
18. How many school children ride school buses to school?

CATEGORY: EDUCATION

Subcategory: Primary, Secondary (Academic), Secondary (Technical/Vocational), Special Education, School Transportation (cont.)

19. What criteria does the school district use in determining which children will be bused to school (for example, distance from the nearest school)?
20. How many school buses does the district have in its fleet?
21. What is the school district's total annual operating budget?
22. How do pupil/teacher ratios compare with the nationwide average or, where applicable, state or local standards?
23. How do average per-pupil operating expenditures compare with those in other comparable school districts?

Subcategory: Postsecondary Education

1. What is the institution's primary service area (e.g., junior college district, specified geographical area)?
2. Is admission restricted to, or is preference accorded to, residents of the primary service area?
3. What is the institution's current total enrollment (full-time equivalent students)?
4. How many local students (i.e., students from primary service area) are there?
5. What is the current population of the primary service area over 18 years of age?
6. What is the design capability (i.e., number of full-time students) of the institution's physical facilities?
7. How many full-time equivalent faculty members does the institution employ?
8. What is the institution's current annual operating budget?

Subcategory: Libraries

1. How many volumes does the library have?
2. How many linear feet of shelving?
3. How many square feet of stack area?

CATEGORY: EDUCATION

Subcategory: Libraries (cont.)

4. How many reader's seats?
5. How many square feet of reader space?
6. How many librarians?
7. How many square feet of total floor space?
8. What is the library's annual operating budget?
9. What are annual capital expenditures?
10. What is the amount of annual debt service?
11. How do number of volumes per capita, reader seats per capita and total floor space per capita compare with published guidelines.
12. How do ratios of volumes per linear foot of shelving, volumes per square foot of stack area and volumes per librarian compare with published guidelines?

EDUCATION

I. General Approach

Education as defined in this analysis includes all formal courses of instruction (academic, technical/vocational, or personal improvement) which are open to the public either on a tax-supported basis and/or upon payment of a designated fee. Primary, secondary academic, secondary technical/vocational, and special education are functionally different subcategories. However, they are dealt with together in a single IPO because of this shared characteristic: total enrollment in the kindergarten through twelfth grade levels is directly related to population in the age group 4 - 17. This is due to legal and social factors which promote school attendance which is all but universal in this age bracket. However, it should be noted that the relative proportions of pupils aged 14 - 17 attending academic versus technical/vocational secondary schools may vary significantly over time and among various communities.

In addition to its functional characteristics, postsecondary education is distinguished from primary, secondary and special education by these features: frequently students come from a wider market area than a single school district; postsecondary education is optional rather than being legally required; and frequently, postsecondary student percentages of persons 18 years and older tend to increase faster than total population in that age group. For this reason postsecondary education is analyzed in a separate IPO.

Public libraries are also treated as a subcategory under education. However, due to different demand characteristics and capacity measures, libraries are analyzed in a separate IPO.

The demands for primary, all secondary, special and postsecondary are computed as separate functions of total population in the respective age categories. These functions represent the number of students to whom the schools must provide educational services in each subcategory. They take into account the number of students attending non-public (i.e., private or religious) schools, as well as the relative distribution of secondary-age students between academic and technical/vocational schools.

Demand for library service is computed partly as a function of population and partly as a function of the number of volumes in the library's collection.

For primary, secondary, special and postsecondary education, capacity is described in terms of two main variables: building capacity and pupil-teacher ratio. Public library capacity is defined in terms of six variables: number of volumes, reader seats, shelf space, stack area, librarians and total floor space.

The potential for BLM impacts on all these subcategories is considerable and will result primarily from a general increase in population. However, demand impacts are likely to be greater in the case of primary, secondary and special education, since demand in these subcategories is directly related to population growth. BLM actions may also increase the property tax base of a school district. While the city or county tax base may also increase, competing demands for available revenues make it uncertain to what extent the library will benefit.

II. Assumptions

There are no important differences between non-metropolitan and metropolitan areas. Educational services are also provided by the private sector, and demand as described above accounts for the percentage of students in a given age group attending non-public schools.

In geographical terms, demand for primary, secondary, and special education should be computed for a particular school district and if possible, mapped by individual school. Demand for postsecondary education should be computed separately for the primary service area if preference in admissions is given to students from a particular geographic area. Library services should be assessed for the entire area of the jurisdiction providing the services (e.g., city, county, library district).

For a given year, student enrollment should be computed as fall enrollment (i.e., as of October 1). Other data should be compiled on an annual basis. Seasonal variations are not likely to pose significant problems in this category.

III. Standards

National guidelines or standards with which local pupil-teacher ratios can be assessed are provided by the National Center for Educational Statistics, which compiles annual nationwide average pupil-teacher ratios. These, however, are only estimates, and do not differentiate among different grade levels. Local school districts and state departments of education should be contacted for possible local or state standards, although the latter are likely to be suggestive rather than binding. No standard or average student-teacher ratios are particularly applicable to postsecondary education. Building capacity on all levels can be assessed with reference to the architect's original design specifications. Per-student operating expenditures may also be compared with other school districts in the area. Per-student operating expenditures may be compared with other districts of similar size, but wide variations exist and such comparisons will only be suggestive at best.

In contrast to schools, the American Library Association publishes detailed library planning guidelines which can be used to assess the effectiveness of current library services. These guidelines define effectiveness in terms of number of volumes, reader space, etc. (For complete list of standards, see IPO chart.)

The potential for the impacts on all these subcategories is considerable and will result primarily from a general increase in population. However, direct impacts are likely to be greatest in the case of primary, secondary and special education, since demand in these subcategories is directly related to population growth. Still, actions may also increase the property tax base of a school district, while the affected county tax base may also increase, competing demands for available revenues make it uncertain to what extent the library will benefit.

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There are no important differences between non-metropolitan and metropolitan areas. Educational services are also provided by the private sector, and demand as described above accounts for the percentage of students in a given age group attending non-public schools.

In geographical terms, demand for primary, secondary, and special education should be computed for a particular school district and if possible mapped by individual school. Demand for postsecondary education should be computed separately for the primary service area if preference in admissions is given to students from a particular geographic area. Library services should be assessed for the entire area of the jurisdiction providing the services (e.g., city, county, library district).

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National guidelines or standards with which local pupil-teacher ratios can be compared are provided by the National Center for Educational Statistics, which compiles annual nationwide average pupil-teacher ratios. These, however, are only estimates, and do not distinguish among different grade levels. Local school districts and state departments of education should be contacted for possible local or state standards, although the latter are likely to be suggestive rather than binding. No standard or average student-teacher ratios are particularly applicable to postsecondary education. Building capacity at all levels can be assessed with reference to the facility's original design specifications. Per-student operating expenditures may also be compared with other school districts in the area. Per student operating expenditures may be compared with other districts of similar size, but wide variations exist and such comparisons will only be suggestive at best.

In contrast to schools, the American Library Association publishes detailed library planning guidelines which can be used to assess the effectiveness of existing library services. These guidelines define effectiveness in terms of number of volumes, reader space, etc. (For complete list of standards, see ALA chart.)

EDUCATION: Primary, Secondary (Academic), Secondary (Tech./Voc.), Special, School Transportation, School Operating and Capital Expenditures

Geographic Area: School District
* indicates the necessity to locate on a map.
Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
1	Total no. public school students	→	Total no. public school students
0	Total no. primary-age children	→	Total no. primary-age children
1	No. primary-age pupils in public primary schools, total and by school	→	No. primary-age pupils in public primary schools, total and by school
1	No. primary-age pupils in public special schools, total and by school	→	No. primary-age pupils in public special schools, total and by school
0	No. secondary-age children	→	No. secondary-age children
1	No. secondary-age pupils in public academic schools, total and by school	→	No. secondary-age pupils in public academic schools, total and by school
1	No. secondary-age pupils in public tech./voc. schools	→	No. secondary-age pupils in public tech./voc. schools
1	No. secondary-age pupils in public special schools, total and by school	* →	No. secondary-age pupils in public special schools, total and by school
1^a	Building capacity of public primary schools, total and by school	* →	Building capacity of public primary schools, total and by school
1^a	Building capacity of public secondary (academic) schools, total and by school	* →	Building capacity of public secondary (academic) schools, total and by school
1^a	Building capacity of public secondary (tech./voc.) schools, total and by school	* →	Building capacity of public secondary (tech./voc.) schools, total and by school

EDUCATION: Primary, Secondary (Academic), Secondary (Tech./Voc.), Special, School Transportation, School Operating and Capital Expenditures (Cont.)

Geographic Area: School District
* indicates the necessity to locate on a map.
Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
4	Name and type of private and religious primary and secondary schools	* →	Name and type of private and religious primary and secondary schools
1^a	Building capacity of public special schools, total and by school	* →	Building capacity of public special schools, total and by school
1	No./length of public primary school shifts	→	No./length of public primary school shifts
1	No./length of public secondary academic school shifts	→	No./length of public secondary academic school shifts
1	No./length of public secondary tech./voc. school shifts	→	No./length of public secondary tech./voc. school shifts
1	No./length of public special school shifts	→	No./length of public special school shifts
1	Total full-time equivalent teachers	→	Total full-time equivalent teachers
1	Public primary school teachers, total and by school	→	Public primary school teachers, total and by school
1	Public secondary (acad.) school teachers, total and by school	→	Public secondary (acad.) school teachers, total and by school
1	Public secondary (tech./voc.) school teachers, total and by school	→	Public secondary (tech./voc.) school teachers, total and by school
1	Total no. public school children bused to school	→	Total no. public school children bused to school
1	Average one-way distance of bus trip	→	Average one-way distance of bus trip
1	Total no. school buses	→	Total no. school buses
1	Criteria/guidelines for busing	→	Criteria/guidelines for busing

EDUCATION: Primary, Secondary (Academic), Secondary (Tech./Voc.), Special, School Transportation, School Operating and Capital Expenditures (cont.)

Geographic Area: School District

* indicates the necessity to locate on a map.

Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
1	Total public schools operating budget	→	Total public schools operating budget
1	Total public schools capital expenditures	→	Total public schools capital expenditures
1	Total public schools debt service	→	Total public schools debt service
2	Operating budgets for other neighboring school districts of similar size	→	Operating budgets for other neighboring school districts of similar size
3	National average pupil/teacher rates, on state/local standards/guidelines	→	National average pupil/teacher rates, on state/local standards/guidelines
0	No. primary-age pupils attending public primary schools	No. primary-age pupils attending public primary schools ÷ total no. primary-age children	Percent of primary-age children in public primary schools
0	No. primary-age pupils attending public special schools	No. primary-age pupils attending public special schools ÷ total no. primary-age children	Percent of primary-age children in public special schools
0	No. public secondary academic pupils	No. public secondary academic pupils ÷ total no. secondary-age children	Percent of secondary-age children in public academic schools
0	No. public secondary tech./voc. pupils	No. public secondary tech./voc. pupils ÷ total no. secondary age children	Percent of secondary-age children in public tech./voc. schools
0	No. secondary-age pupils attending public special schools	No. secondary-age pupils attending public special schools ÷ total no. secondary-age children	Percent of secondary-age children in public special schools
4	Enrollment in private and religious primary and secondary schools, by age	→	Enrollment in private and religious primary and secondary schools, by age

EDUCATION: Primary, Secondary (Academic), Secondary (Tech./Voc.), Special, School Transportation, School Operating and Capital Expenditures (cont.)

Geographic Area: School District

Source Number	INPUT	PROCESS	OUTPUT
0	No. primary-age pupils in public special schools	No. primary-age pupils in public special schools + no. secondary-age pupils in public special schools	Total no. pupils in public special schools
0	No. public primary school teachers, total/by school	No. public primary school teachers, total/by school ÷ public primary school pupils, total/by school	Public primary pupil/teacher ratio, total/by school
0	No. public secondary (academic) school teachers, total/by school	No. public secondary (academic) school teachers, total/by school ÷ no. public secondary (academic) school pupils, total/by school	Public secondary (academic) pupil/teacher ratio, total/by school
0	No. public secondary (tech./voc.) schools teachers, total/by school	No. public secondary (tech./voc.) school teachers, total/by school	Public secondary (tech./voc.) pupil/teacher ratio, total/by school
0	No. public special school teachers, total/by school	No. public special school teachers, total/by school ÷ public special school pupils, total/by school	Public special pupil/teacher ratio, total/by school
0	National average pupil/teacher ratio, or state/local standards/guidelines as available	National average pupil/teacher ratio, or state/local standards/guidelines as available < > local pupil/teacher ratios (if possible, by subcategory and individual school as well as district-wide	Standards/guidelines compared with local teacher/pupil ratios

EDUCATION: Primary, Secondary (Academic), Secondary (Tech./Voc.), Special, School Transportation, School Oeprating and Capital Expenditures (Cont.)

Geographic Area: School District

Source Number	INPUT	PROCESS	OUTPUT
0	No. public primary school pupils, total/by school	No. public primary school pupils, total/by school ÷ public primary school building capacity total/by school	Public primary building utilization, total/by school
0	No. public secondary (academic) pupils, total/by school	No. public secondary (academic) pupils, total/by school ÷ public secondary (academic) building capacity, total/by school	Public secondary (academic) building utilization, total/by school
0	No. public secondary (tech./voc.) pupils, total/by school	No. public secondary (tech./voc.) pupils, total/by school ÷ public secondary (tech./voc.) building capacity, total/by school	Public secondary (tech./voc.) building utilization, total/by school
0	No. public special pupils, total by school	No. public special pupils, total by school ÷ public special building capacity, total/by school	Public special school building capacity, total/by school
0	Total district operating expenditures	Total district operating expenditures ÷ by total no. public school pupils	Average operating expenditures per pupil
0	Average per pupil operating expenditures in other comparable districts	Average per-pupil operating expenditures in other comparable districts <> average per-pupil expenditures in subject district	Comparison between other district operating expenditures and local expenditures
1	Percent of secondary students who graduate	→	Percent of secondary students who graduate

EDUCATION: Primary, Secondary (Academic), Secondary (Tech./Voc.), Special, School Transportation, School Operating and Capital Expenditures

Sources

1. Contacts with local school district.

2. Contacts with other school districts; state Department of Education may also compile this information.

3. National average pupil-teacher ratios by year may be obtained from National Center for Evaluation Statistics (NCES), Washington, D.C. NCES ratios represent the national norm rather than an actual performance standard. Local school district/state department of education should be contacted to determine whether either sets such standards of its own. Impact of projected population growth on current pupil/teacher ratios may also be compared with current or historical local norms.

4. Contacts with private and religious schools.

0. System output.

EDUCATION: Post-Secondary Education

Geographic Area: County/Multi-County

Source Number	INPUT	PROCESS	OUTPUT
1	Primary service area	→	Primary service area
1	Geographical preferences/restrictions in admissions	→	Geographical preferences/restrictions in admissions
1	Total enrollment*	→	Total enrollment*
1	No. primary area students*	→	No. primary area students*
0	Current primary service area population over 18 years old	→	Current primary service area population over 18 years old
1	Design capacity of facilities	→	Design capacity of facilities
1	Current no. faculty*	→	Current no. faculty*
1	Current annual operating budget	→	Current annual operating budget
1	Revenue base	→	Revenue base
0	Total enrollment*	Total enrollment — current no. students* from primary service area	Current no. students* from out of primary area
0	No. primary area students*	No. primary area students* ÷ primary area population over 18 years old	Percent of adult population attending institution
0	Total no. students	Total no. students ÷ current no. faculty	Area students* current student-faculty ratios
0	Current annual operating budget	Current annual operating budget ÷ current total enrollment*	Current average operating expenditures per student

* Full-time equivalents.

EDUCATION: Post-Secondary

Sources

1. Contacts with subject institution.

0. System output.

EDUCATION: Libraries

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
1	Number of volumes	→	Number of volumes
1	Linear feet of shelving	→	Linear feet of shelving
1	Stack area (sq. ft.)	→	Stack area (sq. ft.)
1	Number of seats	→	Number of seats
1	Reader space (sq. ft.)	→	Reader space (sq. ft.)
1	Number of librarians	→	Number of librarians
1	Additional floor space	→	Additional floor space
1	Current annual operating costs	→	Current annual operating costs
0	Current population	→	Current population
0	Number of volumes	No. of volumes ÷ current population	No. volumes per capita
0	Number of volumes	No. of volumes ÷ linear feet of shelving	No. volumes per linear foot of shelving
0	Number of volumes	No. of volumes ÷ stack area (sq. ft.)	Volumes per square foot of stack area
0	Number of seats	No. of seats ÷ population	No. of seats per capita
0	Reader space (sq. ft.)	Reader space ÷ no. of seats	Average no. of sq. ft. per seat
0	Number of volumes	Number of volumes ÷ number librarians	Ratio volumes/librarians
0	Number of cards issued	→	Number of cards issued

EDUCATION: Libraries

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
0 0	Number of cards issued Population above six years of age	Number of cards ÷ population above six years of age	Percent of population with library cards
0	Total floor space	Total floor space ÷ current population	Square feet of floor space per capita
2	Published standards for volumes per capita	→	Published standards for volumes per capita
2	Published standards for volumes per linear foot of shelving	→	Published standards for volumes per linear foot of shelving
2	Published standards for volumes per square foot of stack space	→	Published standards for volumes per square foot of stack space
2	Published standards for readers' seats per capita	→	Published standards for readers' seats per capita
2	Published standards for sq. ft. reading area per seat	→	Published standards for sq. ft. reading area per seat
2	Published standards for librarians per capita	→	Published standards for librarians per capita
2	Published standards for total floor space per capita	→	Published standards for total floor space per capita
0	Published standards	Standards current local levels	Comparison between current local levels of services and standards
1	Annual operating budget	→	Annual operating budget

EDUCATION: Libraries

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
1	Annual capital expenditures	→	Annual capital expenditures
1	No. of mobile units	→	No. of mobile units
1	No. of microfiche units	→	No. of microfiche units

EDUCATION: Libraries

Sources

1. Contacts with local library.

2. American Library Association, Subcommittee on Standards for Small Libraries, Public Library Association, Interim Standards for Small Public Libraries: Guidelines Toward Achieving the Goals of Public Library Service, Chicago, 1962.

0. System output.

III. ENERGY SERVICES

CATEGORY: ENERGY SERVICES

Services of public and/or private companies for providing electricity, gas, and fuel to residential commercial and industrial users.

Subcategory: Electric Utilities

Public or private companies that provide electrical power to end users.

- electric supply system	(number of power stations) (capacity-megawatts) (reserve margin-megawatts)
- electric distribution system	(number of substations) (number and miles of distribution lines) (geographic dispersion of substations and lines) (voltage levels) (number of outages)
- electric distribution system personnel	(number of personnel)

Subcategory: Natural Gas Utilities

Public or private companies that provide gas heating services to end users.

- natural gas supply system	(reserve capacity in BTUs)
- natural gas distribution system	(storage capacity in BTUs) (gallonage) (number of distribution mains) (number of pressure stations)
- distribution system personnel	(number of personnel)

Subcategory: Heating Fuel Companies

Private companies that provide fuel oil and/or other fuels for heating services to end users.

- heating fuel supply system	(supply date) (production-gallons per day) (storage-gallonage)
- heating fuel distribution system	(storage-gallonage) (number of trucks)
- distribution system personnel	(number of personnel)

CATEGORY: ENERGY SERVICES

Subcategory: Electric Utilities

1. What is the number of power generating stations servicing the area?
2. What is the combined overall capacity of these generating stations?
3. What is the reserve margin (the excess capacity that exists at the period of peak demand on the system) of this system?
4. How does the reserve margin of this system compare with the 15% reserve margin typically used by Regional Reliability Councils and State Public Utility Commissions?
5. What is the number of transmission lines serving the local area?
6. What are the size or sizes of these transmission lines?
7. What is the number of substations in the area?
8. What is the number of distribution lines in the area?
9. What is the geographic dispersion of substations and distribution lines in the area?
10. What is the total number of load sources (industrial, commercial, and residential customers) in the area?
11. What is the quality of service in the area? Quality of service can be measured in terms of voltage levels and current balance of distribution system.
12. What has been the recent magnitude of voltage drop in the distribution system?
13. What has been the number and average duration of power outages on the system? Number of outages is a measure of service reliability of a system.
14. How do the quality and reliability levels of the local distribution system compare with Rural Electrification Administration (REA) guidelines on quality and reliability?
15. What is the number of workers that service the distribution system?

CATEGORY: ENERGY SERVICES (cont.)

Subcategory: Natural Gas Utilities

1. What is the quantity of natural gas supplied by the transmission (pipeline) company to the distribution company?
2. What is the anticipated quantity of natural gas demanded by the distribution companies?
3. Does or is it anticipated that the quantity of gas demanded will exceed the quantity supplied?
4. Has the transmission company had to restrict or curtail gas supplies to the distribution company in recent years?
5. Is there a current moratorium on new gas taps (customers) in the retail service area?
6. What is the total number of gas taps in the area?
7. What is the storage capacity of the distribution company?
8. What is the number of distribution mains in the area?
9. What is the pressure capacity of these mains?
10. What is the number of pressure stations in the area?
11. Are the existing mains and pressure stations providing adequate pressure quality in the area?
12. What is the number of workers that service the distribution system?

Subcategory: Heating Fuel Companies

1. What is the quantity of heating fuel (or crude oil) supplied to the refinery or terminal station in the region?
2. What is the production capacity at this refinery?
3. What is the storage capacity at the refinery?
4. What is the peak capacity of heating fuel demanded by distributors in the region? Demand is measured by a degree-days system.
5. What is the ratio between peak quantity demanded in the region and the overall supply (production and storage) capability of the refinery or terminal station?
6. What is the overall storage capacity of the heating fuel distribution company (or companies) in an area?

Subcategory: Heating Fuel Companies (cont.)

7. What is the peak quantity of heating fuel demanded by end users in the local area?

8. What is the ratio of peak quantity of heating fuel demanded by end users and the overall supply capability of the distribution company?

9. What is the number of tank trucks operated by the distribution company?

10. What is the number of workers employed by the distribution company?

ENERGY SERVICES

I. General Approach

Energy services are defined as provision by private and/or public companies of electricity, gas, or heating fuel to end users. The three major suppliers of these services are electric utilities, natural gas utilities, and heating fuel companies. Accordingly, these suppliers comprise the three subcategories under energy services. The IPO charts for these subcategories were intended to serve a dual purpose: 1) to describe the physical components, or the network of a supply system, and 2) to determine the system's capability to expand services.

Different criteria are required to measure the capability of each system. For electric utilities, the first step is to determine the capacity (measured in megawatts) of the system's power stations. Secondly, the maximum peak demand (or usage level) should be derived and compared with the above megawatt capacity in order to determine the reserve margin of the system. State Public Utility Commissions generally require electric utilities to maintain reserve margins of 15 to 20 percent excess capacity over peak demand. If a utility cannot maintain the required reserve margin, it must either expand power generating facilities or cease service to new customers. Service reliability and quality are also important in assessing the performance of an electric utility system. These are typically measured by the level of voltage drops and the average duration of power outages of a system. For example, if voltage levels continually drop below 120 volts, or if power outages extend beyond an average of six consumer-hours outage per customer per year, the distribution system generally requires improvement to ensure acceptable service.

For natural gas utilities, the planner must initially consider the relationship between the quantity of gas supplied by the transmission company and the quantity demanded by the distribution company. If the supply of gas has exceeded demand for gas in recent years, then the distribution company may be able to expand service (increase the number of gas taps) in the area. However, if supplies to the distribution company have been curtailed due to reserve shortage and/or if a moratorium on new gas taps has been imposed on the company, the possibility for expansion in the local area is minimal. Therefore, the quantity supplied primarily determines the capacity of a distribution system, whereas the number of gas taps (customers) provides a measure of demand. The performance of a distribution system is measured in pressure capacity levels of gas lines. If these levels fall below acceptable standards set by industry guidelines, the number of distribution and pressure mains within the system must be increased in order to maintain acceptable service. The decision to expand a local distribution network is generally made exclusively by the utility company.

For heating fuel, system capacity is measured in two ways: the production capacity of the refinery and the storage capacities of the refinery (or terminal station) and the local distribution company. The production and storage capacities of a refinery determine its overall supply capability, whereas the storage capacity of the local distribution company measures its supply capacity. The demand for heating fuel is dependent upon the number of customers in the service area and the number of degree-days (coldness of climate) each year. If the demand for heating fuel is greater than the supply in the service area, the distribution company must increase its storage capacity and/or the number of tank trucks.

Overall, these IPO charts are designed to illustrate the supply/demand relationships for energy services. With this information, the planner can conduct a quick assessment of the expansion capabilities of the services. However, BLM probably will have a very limited role in any expansion activities. Energy service companies, particularly public utilities, have large planning and engineering departments and these groups will have primary involvement in any expansion decisions. Essentially, the BLM planner might identify the need for an expansion and inform the service company. However, the company typically will assume primary responsibility. If a BLM action were expected to increase local population, this change in turn would increase the demand for local energy services. The BLM planner would inform the energy service company of the estimated magnitude of this population change, and the company would determine whether it possessed the current capability to absorb this change, or if new facilities would be required.

II. Assumptions

There are several important assumptions or factors that might affect this assessment of local energy services. First, in metropolitan areas, a new or potential end user of energy might be able to select between two or more energy services. For example, if natural gas curtailments limit the expansion of that service in an area, prospective customers may be able to secure energy supplies from the local heating fuel company. However, non-metropolitan areas often have access to only one type of energy service. Thus, the planner must focus on the expansion capability of the particular service.

As previously indicated, there is a clear separation between the planning roles of the public agencies and those of the energy service companies. The BLM and/or other public agenices might identify a need for local expansion of energy service. However, beyond this point, the service company will plan and make the actual decision to expand facilities.

Since energy services are in fact utilized by every local dwelling unit and business establishment, these services are spread throughout the area. However, the location of various elements (e.g., substations, distribution lines, storage terminals, etc.) of energy suppliers may affect the reliability

and/or accessibility of service. Therefore, these elements should be mapped to show their location and distribution within the county and/or municipalities. The lack or shortage of these facilities in a proposed project area may serve to indicate that the energy service may have to undertake expansion efforts.

The demand for energy service often is a function of local weather conditions. Accordingly, there are often peak demand periods during extremely hot or cold weather. In assessing the capability of energy services, the planner should always collect data on the system's peak demand period. In turn, the peak demand data should be compared to the system's overall capacity in order to determine the level of excess capability.

III. Standards

Few standards or guidelines are available to measure the performance of energy service. State Public Utility Commissions and the Rural Electrification Administration have issued guidelines for electric utilities on service reliability and quality. Comparable standards are not available for natural gas utilities and heating fuel companies. However, as the expansion of facilities or capacity was primarily an internal decision of the energy service company, quality and reliability are inherent parts of an energy service and the service company maintains primary responsibility for these functions.

ENERGY SERVICES: Electric Utilities

Geographic Area: County/local area

* indicates the necessity to locate on a map.
Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
1	Number of power stations	* →	Number of power stations
1^a	Number of fossil fuel power plants	* →	Number of fossil fuel power plants
1^a	Number of hydroelectric power plants	* →	Number of hydroelectric power plants
1^a	Number of nuclear power plants	* →	Number of nuclear power plants
1	Level of station's output	Level of output ÷ level of capacity	Reserve margin of local supply system
1	Level of station's output	→	Level of station's output
1	Level of station's capacity	Level of output ÷ level of capacity	Reserve margin of local supply system
2	Recommended guidelines for reserve margins	→	Comparison of the reserve margin of the local supply system with reserve margin guideline
1	Number of transmission lines	* →	Number of transmission lines
1	Size of transmission lines	→	Size of transmission lines
1	Number of substations	* →	Number of substations
1	Number of distribution lines	* →	Number of distribution lines
1	Total number of load sources	→	Total number of load sources

ENERGY SERVICES: Electric Utilities

Geographic Area: County/local area

Source Number	INPUT	PROCESS	OUTPUT
1	Level of voltage drop	→	Level of voltage drop
3	REA guidelines on acceptable voltage drop levels	→	Comparison of local voltage drop levels with REA guidelines
1	Number of outages	→	Number of outages
1	Average duration of outages	→	Average duration of outages
3	REA guidelines on outage levels	→	Comparison of local outage rates with REA guidelines
1	Number of service personnel	→	Number of service personnel

ENERGY SERVICES: Electric Utilities

Sources

1. Primary contact with representatives of local electric utility company.

2. Primary contact with representatives of State Public Utilities (or Service) Commissions and Regional Reliability Councils.

3. Primary contact with representatives of the Rural Electrification Administration (REA), USDA, Washington, D.C., or appropriate State offices. Also consult the following sources for supplementary information: Rural Electrification Administration, Voltage and Current Investigations, Bulletin 161-8, August 22, 1955, and Rural Electrification Administration, Service Reliability, Bulletin 60-7, June 1, 1960. The above are available from REA's Washington, D.C. office

ENERGY SERVICES: Natural Gas Utilities

Geographic Area: County/local area

* indicates the necessity to locate on a map.

Source Number	INPUT	PROCESS	OUTPUT
1	Quantity supplied by transmission company	→	Energy supplied by transmission company
1	Anticipated quantity demanded by distribution company	→	Comparison of local supply/demand situation
1	Storage capacity of the distribution company	→	Storage capacity of the distribution company
1	Number of gas taps in the area	→	Number of gas taps in the area
1	Number of distribution mains	* →	Number of distribution mains
1	Pressure capacity of distribution mains	→	Pressure capacity of distribution mains
1	Number of pressure mains	→	Number of pressure mains
1	Number of service personnel	→	NUmber of service personnel

ENERGY SERVICES: Natural Gas Utilities

Sources

1. Primary contact with representatives of local natural gas utility company.

ENERGY SERVICES: Heating Fuel

Geographic Area: County/local area

Source Number	INPUT	PROCESS	OUTPUT
1	Quantity of heating fuel supplied to refinery	→	Quantity of heating fuel supplied to refinery
1	Production capacity of refinery	→	Production capacity of refinery
1	Storage capacity of refinery	→	Storage capacity of refinery
		Production + storage capacities	Overall supply capacity of refinery
1	Peak quantity demand by distribution companies	→	Comparison of the peak quantity demanded by distribution companies and overall supply capacity of refiery
2	Storage capacity of local distribution company	→	Storage capacity of local distributio company
2	Peak quantity demanded by local end users	→	Comparison of peak quantity demanded by local end users and overall supply capacity of distribution company
2	Number of trucks operated by distribution company	→	Number of trucks operated by distribution company
2	Number of distribution company workers	→	Number of distribution company workers

ENERGY SERVICES: Heating Fuel

Sources

1. Primary contact with representatives of local heating fuel refinery or terminal.

2. Primary contact with representatives of local distribution company.

IV. FIRE PROTECTION

CATEGORY: FIRE PROTECTION

Fire protection involves the prevention and suppression of domestic, commercial, industrial.

Subcategory: Fire Prevention

Fire prevention involves minimizing the likelihood of fires and reducing potential damage from fires through public education, and building inspection.

- fire codes, building codes, other statutes	(list)
- inspections	(number of full-time equivalent employees)
- education/public information requirements	(list)

Subcategory: Fire Suppression

Fire suppression extends from affording the timeliest possible warning, adequate water supplies, personnel and equipment in order to minimize the damage to persons and property from fire.

- fire flow	(gallons per minute; duration)
- alarm boxes	(number)
- fire houses	(number)
- firemen	(number of full-time equivalent employees)
- fire chiefs/ battalion officers	(number of full-time equivalent employees)
- pumper trucks	(number of vehicles)
- ladder trucks	(number of vehicles)
- fire hydrants	(number)
- operating budget	(dollars per year)
- capital expenditures	(dollars per year)
- debt service	(dollars per year)

CATEGORY: FIRE PREVENTION

Subcategory: Fire Prevention

1. What building codes, fire codes and other applicable codes and statutes are in effect?
2. How many building, fire, electrical inspectors does the community employ?
3. How many inspections do they perform annually?
4. What is the extent of public education programs dealing with fire prevention?
5. What is the insurance underwriters' rating of local fire prevention programs?

Subcategory: Fire Suppression

1. How many alarm boxes are there and where are they located?
2. How many firehouses are there and where are they located?
3. How many full-time or volunteer firemen are there?
4. How many pumper trucks are there and what is their pumping capacity?
5. How many ladder trucks are there?
6. What other vehicles (e.g., rescue vans, chief's cars) are there?
7. How many fire hydrants are there and where are they located?
8. What is the fire department's annual operating budget?
9. What is the community's water supply for firefighting?
10. What is the fire department's service area (e.g., does it answer calls beyond jurisdictional boundaries)?
11. What is the current population and where is it located?
12. What is the projected increase in population and what is its anticipated location?
13. How does the number and location of fire equipment and personnel compare with standards published by the American Insurance Association?

CATEGORY: FIRE PREVENTION

Subcategory: Fire Suppression (cont.)

14. What is the amount/duration of local water system's maximum flow rate at minimum pressure?

15. How does above flow rate compare with AIA standards?

16. What is the fire department's operating budget?

17. What is the amount of capital expenditure for fire department purposes?

18. What is the amount of annual debt service for fire department purposes?

FIRE PREVENTION

I. General Approach

Prevention and suppression of fires are treated as separate subcategories in this analysis. Although the demand for and the capacity of fire prevention programs can be difficult to identify and quantify, the IPO identifies the various elements of an effective fire prevention program. In addition, American Insurance Association (AIA) ratings evaluate fire prevention programs quantitatively on a point basis.

Fire insurance ratings also take into account the demand for and effectiveness of fire suppression services. In the IPO chart demand and capacity are evaluated in categories based on those used by the American Insurance Association in computing fire insurance ratings. Unlike AIA fire prevention ratings, which are somewhat subjective, the standards used in measuring the effectiveness of fire suppression services are more readily quantifiable. Demand for and capacity of fire flow, pumper trucks and ladder trucks are computed with reference to the size of the population. Fire houses, alarm boxes and fire hydrants are evaluated with reference to the geographic distribution of residential and other development. Demand for firemen and fire chiefs is computed on the basis of number or type of fire engines and number of engine companies.

The chief tasks left to the analyst include mapping residential and other development, and overlaying location-sensitive facilities such as fire hydrants and alarm boxes in order to compare the latter with published standards. Otherwise, the IPO provides the essential framework for evaluating fire protection services.

The potential for BLM impacts on this service category is considerable due to population increase and changing patterns of residential, commercial and industrial development.

II. Assumptions

Qualitative and quantitative differences between the effectiveness of the fire protection and fire prevention programs in metropolitan and non-metropolitan communities are taken into account in AIA standards, which should be used accordingly.

Fire service should be described with reference to the main service area. That is, if a community is part of a joint fire district, its firefighting requirements and resources should be considered together with those of all participating communities within that district. If the fire department

answers calls outside its immediate jurisdiction on a contract or emergency basis, this fact should be noted in the data base, but the outlying service areas are excluded from the analysis of capacity and demand.

Certain types of facilities (i.e., fire houses, alarm boxes and fire hydrants), must also be mapped individually against the distribution of residential and other development.

In some cases, such as those of high-value industrial installations, a private firefighting capacity may exist. Whether or not this private capacity affects local and BLM planning is a relatively complicated issue involving the entire basis of local fire protection planning and accordingly should be discussed with local officials responsible for planning.

III. Standards

The AIA standards used as the basis for this analysis are not legally binding, but have considerable influence in the planning process due to their impact on fire insurance costs. The complexity of the actual formula used in computing fire insurance rating precludes computation of overall ratings in the IPO. However, the elements evaluated in the IPO (e.g., fire flow, alarm boxes, etc.) are those on which the rating is based. In attempting to evaluate the effects of BLM-related developments on overall fire insurance ratings, as opposed to individual elements, the analyst should contact the local or regional insurance services office.

FIRE PROTECTION: Fire Prevention

Geographic Area: Incorporated Areas, County for Unincorporated Areas

Source Number	INPUT	PROCESS	OUTPUT
1	Building codes, fire codes, other applicable statutes in effect	→	Building codes, fire codes, other applicable statutes in effect
1	Number of building, fire, other inspectors	→	Number of building, fire, other inspectors
1	Number of annual inspections	→	Number of annual inspections
1	Educational/public information programs	→	Educational/public information programs
2	AIA rating of fire prevention programs (points)	→	AIA rating of fire prevention programs (points)

FIRE PROTECTION: Fire Prevention

Sources

1. Contact with local fire officials.

2. Contact with local fire officials or, if necessary with local or regional insurance services office.

FIRE PROTECTION: Fire Suppression

Geographic Area: Incorporated Areas, County for Unincorporated Areas
* indicates the necessity to locate on a map.
Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
1	Current fire insurance rating	→	Current fire insurance rating
1	Community's water supply for fire-fighting	→	Community's water supply for fire-fighting
1^a	Number/pumping capacity of engine companies	→	Number/pumping capacity of engine companies
1^a	Number of ladder companies	→	Number of ladder companies
1	Location of engine/ladder companies	* →	Location of engine/ladder companies
1^a	Number/type of other vehicles	→	Number/type of other vehicles
1	Number of fire chiefs	→	Number of fire chiefs
1	Number of firemen	→	Number of firemen
1	Number of full-time firemen	→	Number of full-time firemen
1	Number of volunteer firemen	→	Number of volunteer firemen
1	Number/location of fire hydrants	* →	Number/location of fire hydrants
1	Number/location of fire alarm boxes	* →	Number/location of fire alarm boxes
1	Service area	→	Service area
0	Annual operating budget	→	Annual operating budget
0	Annual capital outlays	→	Annual capital outlays

FIRE PROTECTION: Fire Suppression (cont.)

Geographic Area: Incorporation Areas, County for Unincorporated Areas

Source Number	INPUT	PROCESS	OUTPUT
0	Annual debt service	→	Annual debt service
2	AIA standards	→	AIA standards
0	Population	AIA standard for required fire flow in similar-sized communities	Local fire flow requirements
0	Local maximum water flow (gpm) at minimum pressure for specified maximum duration	→	Local maximum water flow (gpm) at minimum pressure for specified maximum duration
0	Required fire flow (gpm) at minimum water system pressure, for a specified duration	Maximum actual flow (gpm) at minimum system pressure duration < > AIA standard	Comparison between actual and required fire flow
0	Population	AIA standards for pumper trucks	Pumper requirements
0	Population	AIA standards for ladder trucks	Ladder truck requirements
0	Required fire flow	Required fire flow < > actual water supply	Comparison between fire flow and actual supply
0	Pumper requirements	Pumper requirements < > actual number of pumpers	Comparison between pumper requirements and available number
0	Ladder truck requirements	Ladder truck requirements < > actual number of ladder trucks	Comparison between ladder truck requirements and available number
0	Current number of engine companies	AIA standards for firemen manning	Required number of firemen
0	Current number of engine companies	AIA standards for number of fire chiefs	Required number of fire chiefs/ battalion officers

Geographic Area: Incorporated Areas, County for Unincorporated Areas
* indicates the necessity to locate on a map.

Source Number	INPUT	PROCESS	OUTPUT
0	Available number of firemen	Available number of firemen <> standard requirement	Comparison between requirements and available number of firemen
0	Available number of fire chiefs/ battalion officers	Available number of fire chiefs/ battalion officers <> standard requirement	Comparison between requirements and available number of fire chiefs/ battalion officers
0	Location of engine companies	Location of engine companies <> standards	Adequacy or inadequacy of existing layout of locations
0	Location of alarm boxes	Location of alarm boxes <> standard	Adequacy/inadequacy of current layout
0	Location of hydrants	Location of hydrants <> standard	Adequacy/inadequacy of current layout

FIRE PROTECTION: Fire Suppression

Sources

1. Contacts with local fire department.

2. American Insurance Association, Standard Schedule for Cities and Towns of the United States with Reference to Their Fire Defenses (updated periodically), New York.

0 System output.

V. FISCAL BASE

CATEGORY: FISCAL BASE

The sum of public funds available, annually and on a long-term basis, to meet expenditures incurred in the provision of public services.

Subcategory: Revenues

All receipts of funds by the government for whatever purpose.

- debt	(dollars outstanding) (dollars of borrowing capacity)
- intergovernmental transfers	(dollars per year)
- non-property tax local revs.	(dollars per capita)
- property tax rate	(mills per $1,000 of assessed valuation)
- property tax base	(dollars)

Subcategory: Expenditures

All disbursements of government funds for whatever purpose.

- transfer payments	(dollars per year)
- operating expenses	(dollars per year)
- capital expenses	(dollars per year)
- debt service	(dollars per year).

CATEGORY: FISCAL BASE

Subcategory: Revenues

1. What is the property tax rate (mills per $1,000 assessed valuation)?
2. What is the total assessed valuation?
3. How much of the total valuation is residential and personal property?
4. How much is commercial property?
5. How much is industrial property?
6. How much is agricultural property?
7. How much is mineral property?
8. What percent of the total property taxes due were actually received?
9. What are revenues from per capita-related taxes (e.g., sales taxes, user fees, fines, license fees, etc.)?
10. What are revenues from recurring per capita-related intergovernmental transfers (e.g., federal revenue sharing, state sharing of mineral tax revenues, etc.)?
11. What are revenues from nonrecurring special intergovernmental transfers (e.g., EDA public works grants, etc.)?
12. What are revenues from recurring non per capita-related local sources (e.g., rentals on publicly-owned property, etc.)?
13. What is the amount of current public debt outstanding?
14. What is the legal debt ceiling?
15. What areas (e.g., storm sewers, etc.) are exempt from the legal debt ceiling?
16. What is the community's bond rating?

Subcategory: Expenditures

1. What is the jurisdiction's total operating budget?
2. What is its operating budget for each category/subcategory?
3. What is the sum of its capital outlays?

CATEGORY: FISCAL BASE

Subcategory: Expenditures (cont.)

4. What are its capital outlays for each category/subcategory?
5. What is its total debt service payment?
6. What are its debt service payments by category/subcategory?
7. On a yearly basis, what are its scheduled debt service payments (total and by category/subcategory)?
8. What is the amount of recurrent intergovernmental transfer payments (total and by individual item)?
9. What is the amount of nonrecurrent intergovernmental transfers (total and by item)?
10. How do current per capita operating expenditures (total and by category/subcategory) compare with historical per capita expenditures in the subject community, as well as per capita operating expenditures in other communities of various demographic characteristics?

FISCAL BASE

I. General Approach

The community's fiscal base consists of the public funds available, annually and on a long-term basis, to meet expenditures incurred in the provision of public services. Subcategories include revenues, analogous to the capacity of the fiscal system to meet the demands placed upon it, and expenditures, analogous to the demand for public funds.

In general, revenues are made up of the following major components:

- Property taxes;
- Per capita-related taxes and other charges;
- Recurring non per capita-related local income;
- Recurring per capita-related intergovernmental transfers;
- Nonrecurring, non per capita-related intergovernmental transfers.

Property taxes are based on the total assessed value of all taxable property within the taxing jurisdiction, times the property tax rates. A relatively small percent of property taxes levied usually are not paid in the year due, a fact which must be accounted for in projecting tax revenues based on total assessments and the property tax rate. Taxable property generally falls into one of the following categories:

- Residential and personal property;
- Industrial property;
- Commercial property;
- Agricultural property (including forest land);
- Mineral property.

Per capita-related taxes and other charges (e.g., sales taxes, user fees, fines, etc.), are levied on individual persons and usually tend to increase or decrease in rough proportion to changes in population.

Recurring non per capita-related local income (e.g., income on rentals of local property) consists of income from local sources other than property taxes or taxes/fees levied against individuals on a uniform basis. Accordingly, it may be expected to remain fairly constant from one year to the next.

Recurring per capita-related intergovernmental transfers (e.g., federal revenue sharing) consist of funds paid by one governmental jurisdiction to another, which are paid annually in amounts on a formula basis, based at least in part on population.

Nonrecurring intergovernmental transfer (e.g., EDA public works grants) are transfers made for a specific period and which may not be expected to recur in the future, unless renewed.

Frequently the local jurisdiction has "cash-on-hand" in the form of left-over uncommitted balances from previous years, which comprise part of the total funds available to meet current expenditures.

An additional major source of revenues consists of indebtedness, usually incurred in the form of local government bonds. Revenues from this source consist of the financial proceeds of the bond sale. In anticipating future revenues available from the sale of bonds, several limiting factors apply:

- Current total outstanding indebtedness;
- Statutory limitations on total allowable indebtedness, including any exemptions (e.g., storm sewers) from the the overall limitation established;
- Financial management considerations (e.g., percentage of total annual revenues absorbed by debt service;
- External limitations (e.g., bond market considerations, credit rating) which may affect ability to sell bonds authorized.

In general, expenditures fall into one of the following categories:

- Intergovernmental transfers;
- Operating expenditures;
- Capital outlays;
- Debt service.

Intergovernmental transfers entail direct payments by one governmental jurisdiction to another. They may be further distinguished as to whether they are:

- Recurrent (e.g., payments for the provision of a contractually agreed service), or
- Nonrecurrent.

Operating expenditures have been computed separately for each government services category and/or subcategory. This separation into categories/subcategories should be retained in compiling data on total expenditures.

Capital expenditures are actual cash outlays on major nonrecurrent capital items such as new buildings or major pieces of equipment such as computers or fire trucks. Since locally available budget data are often inconsistent in their definition of what constitutes capital expenditures, the analyst may wish to define capital expenditures as those financed through bond sales. Other definitions are possible, depending on data availability and the use to which the data are to be put.

Debt service comprises annual repayments on the community's outstanding public debt. If possible, total debt service should be disaggregated by individual bond issue (identified with respect to date of issue and maturity, as well as average interest rate) and purpose (e.g., city hall construction, fire engine purchase). The analyst should also, if possible, obtain future debt service payment schedules for each bond issue.

The community's revenue base is likely to be directly affected by BLM actions, to the extent that the latter lead to an influx of population or expansion of commerce, agriculture or industry. The community's expenditures are likely to be affected indirectly by BLM actions, to the extent that the latter generate new population or other sources of service needs, and the community elects to meet these needs by increasing overall service levels.

One way to establish a benchmark for use in assessing future operating expenses involves dividing current total operating expenditures for each category or subcategory by the population served (or the number of students, in the case of school districts). Multiplying current per-capita or per-student operating expenditures by the projected number of inhabitants or students should approximate the operating expenditures (in present-year dollars) required to maintain the current level of services to an expanded population. Projecting future debt service requirements on capital expenditures required to accomodate the infux in population may be estimated based on the current public debt outstanding, the capacity and utilization of existing capital facilities, and the cost of new equipment facilities.

The total of projected operating expenditures plus debt service may then be used as a rough indication of the revenues (in present-year dollars) which must be raised to provide approximately current service levels. Alternately, it may be compared with revenue projections (if the latter are available)

to determine the sufficiency of projected revenues. If projected revenues appear insufficient, this indicates probable need either for increasing revenues (e.g., through an increase in the property tax rate), or for cutting back on levels of some or all services.

II. Assumptions

Revenues and expenditures should be calculated individually for each taxing jurisdiction, even where more than one jurisdiction overlap, i.e., counties and county school districts.

The historical period for which data are to be gathered is left to the analyst's discretion, depending on data availability and other considerations. At a minimum, it should include both projected expenditures for the current fiscal year and actual expenditures from the preceding fiscal year. Data from earlier years (e.g., three and five years earlier), are also useful in helping the analyst spot any short-term fluctuations in revenues or expenditures due to extraordinary factors. Such short-term fluctuations should be normalized, by averaging or other techniques as applicable. Historical comparisons may also illuminate the relationship between overall population and per capita expenditures on services.

III. Standards

The adequacy of public revenues is a function of expenditure requirements. Comparisons of assessments and revenues (total and per capita) among different taxing jurisdictions can be useful, particularly in assessing the relative fiscal impact of BLM actions on different communities. The results of any such comparison should be analyzed in the light of varying services provided and expenditures in the communities compared.

A community's current expenditures (total and per capita) may be compared with historical figures for the same community. Comparisons are also possible with other communities showing a variety of demographic characteristics, including comparable growth levels.

FISCAL BASE: Revenues

Geographic Area: Taxing Jurisdiction

Source Number	INPUT	PROCESS	OUTPUT
1	Property tax rate	→	Property tax rate
1	Total assessed valuation	→	Total assessed valuation
1	Total residential and personal property assessments	→	Total residential and personal property assessments
1	Total commercial assessments	→	Total commercial assessments
1	Total industrial assessments	→	Total industrial assessments
1	Total agricultural assessments	→	Total agricultural assessments
1	Total mineral assessments	→	Total mineral assessments
2	Percent of property taxes due actually collected	→	Percent of property taxes due actually collected
2	Per capita related tax revenues (except intergovernmental transfers)	→	Per capita related tax revenues (except intergovernmental transfers)
2	Per capita related recurring intergovernmental transfers	→	Per capita related recurring intergovernmental transfers
2	Local non-per capita-related recurrent revenues	→	Local non-per capita-related recurrent revenues
2	Nonrecurrent intergovernmental revenues	→	Nonrecurrent intergovernmental revenues
2	Cash on hand	→	Cash on hand

FISCAL BASE: Revenues (cont.)

Source Number	INPUT	PROCESS	OUTPUT
2	Current revenues from sale of bonds	→	Current revenues from sale of bonds
2	Current outstanding public debt	→	Current outstanding public debt
2	Legal debt ceiling	→	Legal debt ceiling
0	Legal debt ceiling	Legal debt ceiling - indebtedness	Available legal bonding capacity
2	Areas outside legal debt ceiling	→	Areas outside legal debt ceiling
2	Local bond rating	→	Local bond rating
0	Population	→	Population
0	Total revenues	Total revenues ÷ population	Per capita revenues
0	Total assessed valuation	Total assessed valuation ÷ population	Per capita assessed valuation

FISCAL BASE: Revenues

Sources

1. Contact with county assessor's office.

2. Contact with local treasurer's office.

0. System output.

FISCAL BASE: Expenditures

Geographic Area: Taxing Jurisdiction

Source Number	INPUT	PROCESS	OUTPUT
1	Annual operating expenditures, total and by category and/or subcategory	→	Annual operating expenditures, total and by category and/or subcategory
1	Annual capital outlays, total and by category/subcategory	→	Annual capital outlays, total and by category/subcategory
1	Annual debt service payments, total and by category/subcategory	→	Annual debt service payments, total and by category/subcategory
1	Scheduled future annaul debt service payments, total and by category/subcategory	→	Scheduled future annual debt service payments, total and be category/subcategory
1	Annual recurring intergovernmental transfers, listed individually	→	Annual recurring intergovernmental transfers, listed individually
1	Annual nonrecurring intergovernmental transfers, listed individually	→	Annual nonrecurring intergovernmental transfers, listed individually
0	Population	→	Population
1	Total operating expenditures	Total operating expenditures ÷ population	Average operating expenditures per capita
0	Annual operating expenditures by category/subcategory	Annual operating expenditures by category/subcategory ÷ population	Average per capita operating expenditures by category/subcategory
0	Per capita operating expenditures, total by category/subcategory in other nearby communities	→	Per capita operating expenditures, total by category/subcategory in other nearby communities

Geographic Area: Taxing jurisdiction

Source Number	INPUT	PROCESS	OUTPUT
0	Expenditures, total and by category/subcategory	Expenditures, total and by category/ subcategory parallel historical figures for subject community, other communities	Comparison between parallel historical figures/ figures for other communities and those of subject community

FISCAL BASE: Expenditures

Sources

1. Contact with local fiscal office (e.g., town municipal, or county clerk-treasurer).

0. System output.

VI. GOVERNMENT

CATEGORY: GOVERNMENT

Public officials or agencies whose function is establishing overall priorities, passing enabling legislation, securing funding, ensuring accountability and providing administrative and other assistance to service-providing agenices.

Subcategory: Administration

Administration includes functions such as supplying data to and advising the legislative authority, interpreting and enacting the latter's decisions, and conducting the daily business of the government when the legislative authority is not in session.

- professional staff	(number of full-time equivalents)
- administrative staff	(number of full-time equivalents)
- operating budget	(dollars per year)

Subcategory: Legislation

Legislation includes the enactment of laws, codes and statutes, as well as attempting to reconcile the competing claims and interests of the constituents in forging policy and setting priorities.

- elected officials	(full-time equivalents)
- administrative staff	(full-time equivalents)
- operating budget	(dollars per year)

Subcategory: Legal Counsel

The functions of legal counsel include advising the legislature on legal questions, preparing ordinances and legal instruments, prosecuting offenders and defending officials, and settling legal claims against the government.

- professional staff	(number of full-time employees)
- administrative staff	(number of full-time employees)
- operating budget	(dollars per year)

Subcategory: Planning

Planning is the anticipation of future demographic, economic and other changes affecting the community as the sources of new human and social needs, and the design of courses of action to meet those needs.

- professional staff	(full-time equivalents)
- administrative staff	(full-time equivalents)
- operating budget	(dollars per year)

Subcategory: Financial Management

Government financial management includes activities which may be classified under the following headings: 1) maintenance of the official accounts; 2) custody of government funds and bank deposit collateral; 3) preparation of the annual budget; 4) advising the legislative and executive offices on financial matters; and 5) the purchasing inventory and control of supplies.

- professional staff	(number of full-time equivalents)
- administrative staff	(number of full-time equivalents)
- operating budget	(square feet)

Subcategory: Building Space

Space occupied by personnel, files, office equipment and storage in the principal government buildings (e.g., city hall, county courthouse, etc.).

- floor space	(square feet)
- operating budget	(dollars per year)
- capital outlays	(dollars per year)
- debt service	(dollars per year)

CATEGORY: GOVERNMENT

Subcategories: Administration, Planning, Legal Counsel, Personnel Services, Financial Management (same questions for each)

1. How many full-time equivalent professional staff does the organization (e.g., planning personnel, etc.) employ?
2. How many non-professional (support) staff (full-time equivalent) does it employ?
3. What is its annual operating budget?
4. What other neighboring communities share similar population, demographic/economic/land use characteristics with subject community now and as it is expected to develop?
5. How do they compare with the subject community in number of professiwnal staff/operating budget in the respective subcategories?

Subcategory: Office Space

1. What is the capacity/utilization of the current facility in terms of personnel?
2. What is the capacity/utilization of the current facility in terms of office machinery?
3. What is the capacity/utilization of the current facility in terms of file/recordkeeping areas?
4. What is the capacity/utilization of the current facility in terms of storage?
5. What is the capacity/utilization of the current facility in terms of other uses?

Subcategory: Legislation

1. How many elected representatives make up the legislature?
2. Are representatives elected on a district or at-large basis, or a combination of the two?
3. What is the current population of each electoral district?
4. What laws or procedures govern the adjustment of electoral districts in response to changing population or residential patterns, or the addition of additional representatives?

CATEGORY: GOVERNMENT

Subcategory: Legislation (cont).

5. How many legislative assistants/staff persons are there?
6. What are the annual operating expenditures of the legislature?

GOVERNMENT

I. General Approach

Government is defined here as those public officials or agencies whose main function is establishing overall priorities, passing enabling legislation, securing funding, ensuring accountability and providing administrative and other assistance to service providing agencies.

Five subcategories or government (administration, planning, legal counsel, personnel services, financial management) are analyzed in a single IPO. Despite their functional differences, they share this characteristic: the few published standards of capacity or quality which do exist for these subcategories are generally vague, and do not directly relate to the special needs of a small and/or rapidly growing community.

Legislation is analyzed separately for the following reasons: legislators are elected rather than appointed and legal or constitutional factors constrain possible changes in the system by which they are elected.

Building space is also treated separately. This is because in many communities, office space is provided for most government agencies as a group, rather than by each agency for its own employees. It also places substantially different data requirements on the analyst.

In the first five subcategories, capacity is measured in terms of the number of professional personnel and operating budget. The latter serves as a proxy for administrative staff, office machines, etc., all of which contribute to an organization's capacity and effectiveness. In the IPO chart, support personnel are also treated separately from operating expenditures. The total number of non-professional personnel, combined with the number of professionals, is intended as an input for determining physical requirements for office space (discussed below) rather than as a specific measure of capacity.

It is more difficult to assess a community's legislative "capacity"; indeed, potential BLM impacts on legislation are less a question of infrastructure capacity than of constitutional law and political perceptions.

Building space capacity is measured in available floor space for occupancy by personnel, files, office equipment, storage and other uses.

Demand for the first five subcategories is chiefly a function of population growth and rate of socioeconomic change. These factors affect not only direct demand for government services, but indirect demand as well, which in turn generates demand for other public services.

The effectiveness of government services is difficult to assess, since it depends not only on personnel (i.e., their training and experience), but also upon the work demands placed on them and political or institutional factors beyond the organization's control. The most practical approach to measuring capacity involves comparing the number of professional personnel and the annual operating budget with those of similar communities in the area. Accordingly, one of the analyst's chief tasks is to compile a file of data on other communities, with information on population, growth rates, and administrative, personnel, planning, legal counsel and financial management (i.e., professional staff and annual operating expenditures). Another, factor to bear in mind, is the existence of statutory tools at the disposal of government agencies. For example, the planning department will probably rely heavily on zoning ordinances and/or land use plans in planning for orderly growth. The analyst should note the existence of such statutory tools, as well as the degree to which they are normally enforced, in assessing the capability of government to deal with change.

Demand for legislative services consists of demand for legislative redistricting, and demands for the services of legislators and their staff. The first type of demand is a function of population growth and distribution alone; the second is a result both of population changes and the rate of socioeconomic change. The IPO chart provides a framework for evaluating current legislative conditions with regard to electoral representation, and factors constraining changes should they become necessary. The ability of individual legislators to function effectively within the framework of available resources is not readily quantifiable. However, the analyst may wish to pursue these questions in contacts with individual legislators and their staff.

Demand for office space encompasses elements besides personnel, including files, office matchines, and space for storage and miscellaneous uses. Total personnel space requirements can be inferred from staff statistics contained in other subcategories. Data on space demands for other purposes must be gathered separately by the analyst.

In all of the above subcategories, there is considerable likelihood of BLM impacts as a result of population growth and general socioeconomic changes.

II. Assumptions

Few substantive differences exist between metropolitan and non-metropolitan areas in this category, although in metropolitan areas the organization set up to handle the above service subcategories may differ from that in a non-metropolitan area. In smaller communities, many officials are employed on a part-time basis, but this discrepancy is avoided in the IPO by the use of the term "full-time equivalent" personnel.

Professional qualifications of individuals may vary between non-metropolitan and metropolitan communities as they may vary among non-metropolitan communities. Professional qualifications emerge as a product of either training, experience, or a combination of both. Since they are difficult to assess quantitativvely they have been excluded from the IPO chart. However, the analyst will wish to keep the issue of professional qualifications in mind when assessing the effectiveness of local government services.

With the exception of legislation all of these subcategories should be analyzed on a jurisdiction-wide basis. If possible, legislative representation should be mapped and recorded on the basis of individual electoral districts.

III. Standards

The level of services in the first five subcategories is best assessed by comparison with other communities having similar population/socioeconomic characteristics. Legislative services may be judged with reference to legal or constitutional requirements as well as to local political perceptions. Building space is judged on the basis of the physical capacity of the building.

GOVERNMENT SERIVCES: Admin., Personnel, Planning, Legal Counsel, Financial Management

Geographic Area: Local jurisdiction
* indicates the necessity to locate on a map.

Source Number	INPUT	PROCESS	OUTPUT
1	Type of government (name)	* →	Type of government (name)
1	Number of professional staff (full-time equivalents)	→	Number of professional staff (full-time equivalents)
1	Number of non-professional staff (full-time equivalents)	→	Number of non-professional staff (full-time equivalents)
1	Organization's annual operating budget	→	Organization's annual operating budget
1, 2	File of neighboring communities including their current population, historical growth rates, professional staff, operating budget of their respective organizations	→	File of neighboring communities including their current population, historical growth rates, professional staff, operating budget of their respective organizations
0	Population/growth rate of subject community	Sort file for communities with similar population/growth rates	Professional staff, non-professional staff, operating budget of organizations in similar communities
0	Number of professional staff in similar communities	Professional staff in similar community professional staff in subject community	Comparison of staff sizes with similar communities
0	Organizational operating budget in similar communities	Organizational operating budget in similar communities ÷ professional staff in respective communities	Average operating expenditures per professional in similar communities
0	Average operating expenditures per professional in similar communities	Similar community average operating expenditures subject community	Comparison of operating expenditures with similar communities

GOVERNMENT SERVICES: Admin., Personnel, Planning, Legal Counsel, Financial Management (cont.)

Geographic Area: Local jurisdiction

Source Number	INPUT	PROCESS	OUTPUT
0	Number of professional staff in subject community	Number of professional staff in subject community + number of non-professional staff	Total number of staff in subject community
1	Titles of major ordinances or regulations by class, including: Land use controls Comprehensive plans Flood plain ordinances Critical areas ordinances Building codes	→	Titles of major ordinances or regulations by class, including: Land use controls Comprehensive plans Flood plain ordinances Critical areas ordinances Building codes

GOVERNMENT SERVICES: Admin., Personnel, Planning, Legal Counsel, Financial Management

Sources

1. Primary contacts with subject organizations

2. U. S. Department of Commerce, Bureau of the Census, Census of Population (Decennial), Washington, D.C., various years.

   Current Population Estimates (Annual) Series P-25 and P-26, Washington, D.C., various years.

0. System output.

GOVERNMENT: Office Space

Geographic Area: Local jurisdiction

Source Number	INPUT	PROCESS	OUTPUT
1	Capacity of current facilities (personnel)	→	Capacity of current facilities (personnel)
1	Current capacity (office machines)	→	Current capacity (office machines)
1	Current capacity (files)	→	Current capacity (files)
1	Current capacity (storage)	→	Current capacity (storage)
1	Current capacity (other uses)	→	Current capacity (other uses)
2	Current utilization (personnel)	→	Current utilization (personnel)
3	Current utilization (office machines)	→	Current utilization (office machines)
3	Current utilization (files)	→	Current utilization (files)
3	Current utilization (storage)	→	Current utilization (storage)
3	Current utilization (other uses)	→	Current utilization (other uses)

GOVERNMENT: Office Space

Sources

1. Contacts with architect, planning department or building inspector.
2. Contacts with organizations using offices.
3. Contacts with local planning department, field surveys, if necessary.

GOVERNMENT: Legislation

Geographic Area: Local jurisdiction

Source Number	INPUT	PROCESS	OUTPUT
1	Number of elected representatives	→	Number of elected representatives
1	Basis on which representatives are elected (district, at-large, combination)	→	Basis on which representatives are elected (district, at-large, combination)
1, 2	Population: entire and by electoral district	→	Population: entire and by electoral district
3	Procedures governing adjustment of electoral district boundaries/ adding seats on legislature	→	Procedures governing adjustment of electoral district boundaries/ adding seats on legislature
1	Number of legislative assistants/ staff	→	Number of legislative assistants/ staff
1	Annual operating expenses	→	Annual operating expenses
0	Number of elected representatives	Number of elected representatives + number of legislative assistants/staff	Total number of personnel, elected and non elected

GOVERNMENT: Legislation

Sources

1. Primary contacts with local legislature.
2. Primary contacts with local legislature, voting officials.
3. Government legal counsel's office.

0. System output.

VII. HEALTH CARE

CATEGORY: HEALTH CARE

Health care systems are those which assist in the prevention, diagnosis and treatment of disease and the provision of medical care and services.

Subcategory: Acute Care

That care for which the average length of stay for all patients is less than 30 days or in which more than 50 percent of all patients are admitted to units where the average length of stay is less than 30 days.

- medical beds	(number of beds)
- surgical beds	(number of beds)
- pediatric beds	(number of beds)
- bassinets	(number of beds)
- OB-GYN beds	(number of beds)
- intensive care beds	(number of beds)
- psychiatric beds	(number of beds)
- operating budget	(dollars per year)

Subcategory: Long-Term Care

That care which provides physician services and continuous professional nursing supervision for patients who are not in an acute phase of illness or medical need. The average length of stay for all patients is 30 days or more, or more than 50 percent of all patients are admitted to units where the average length of stay is 30 days or more.

- skilled nursing beds	(number of beds)
- intermediate care beds	(number of beds)
- domiciliary care beds	(number of beds)
- operating budget	(dollars per year)

Subcategory: Emergency Medical Care

Hospital facilities for the provision of emergency out-patient services on a 24-hour basis to patients whose conditions are considered to require immediate care.

- rescue center	(number of centers)
- ambulance	(number of vehicles)
- 4-wheel drive emergency vehicles	(number of vehicles)
- helicopters for emergency use	(number)

CATEGORY: HEALTH CARE

Subcategory: Emergency Medical Care (cont.)

- emergency rooms	(number of rooms)
- operating budget	(dollars per year)

Subcategory: Ambulatory Care

Hospital services, clinics or offices for the provision of non-emergency medical and/or dental services for walk-in patients.

- facilities	(number of examining rooms)

Subcategory: Medical Personnel

Those people responsible for rendering general medical care and related services.

- physicians	(number of full-time equivalents)
- registered nurses	(number of full-time equivalents)
- licensed practical nurses	(number of full-time equivalents)
- dentists	(number of full-time equivalents)
- medical aides	(number of full-time equivalents)
- pharmacists	(number of full-time equivalents)
- optometrists	(number of full-time equivalents)
- podiatrists	(number of full-time equivalents)
- osteopaths	(number of full-time equivalents)
- pediatrians	(number of full-time equivalents)
- chiropractors	(number of full-time equivalents)

CATEGORY: HEALTH CARE

Subcategory: Acute Care Facilities

1. How many hospitals providing acute care exist?
2. Will there be sufficient intensive care beds to meet new demand?
3. Will their be sufficient bassinets to meet new demand?
4. Will there be sufficient pediatric beds to meet new demand?
5. Will there be sufficient medical beds to meet new demand?
6. Will there be sufficient medical beds to meet new demand?
7. Will there be sufficient surgical beds to meet new demand?
8. Will there be sufficient psychiatric beds to meet new demand?
9. What are the current occupancy rates?
10. How do current bed/population ratios compare with state or national averages?
11. Is the current operating budget sufficient to meet new demand?
12. What are annual operating expenditures?
13. What capital expenditures, if any, are there?
14. What is the annual debt service on bond issues?
15. What is the schedule of payments for debt service?

Subcategory: Long-Term Care Facilities

1. How many long-term care facilities exist?
2. Will there be sufficient skilled nursing care beds to meet new demand?
3. Will there be sufficient intermediate nursing care beds to meet new demand?
4. Will there be sufficient domiciliary nursing care beds to meet new demand?
5. What is the current occupancy rate of long-term care facilities by bed type?

CATEGORY: HEALTH CARE (cont.)

Subcategory: Long-Term Care Facilities

6. How do current bed/population ratios compare with state or national averages?
7. Is the current operating budget sufficient to meet new demand?
8. What are annual operating expenditures?
9. What capital expenditures, if any, are there?
10. What is the annual debt service on bond issues?
11. What is the schedule of payments for debt service?

Subcategory: Emergency Medical Care

1. How many rescue centers are there?
2. How many emergency rooms are there?
3. How many ambulances are there?
4. How many emergency 4-wheel drive vehicles are there?
5. How many helicopters can be made available for an emergency?
6. How many ambulance trips per day are there on an average currently?
7. What is the average response time for ambulances?
8. Will there be a high rate of accidents associated with the new employment as a result of a BLM action?
9. What are annual operating expenditures?
10. What capital expenditures, if any, are there?
11. What is the annual debt service on bond issues?
12. What is the schedule of payments for debt service?

Subcategory: Ambulatory Care

1. How many outpatient clinics are there?
2. How many examining rooms are available for outpatient services?
3. What is the average waiting time for services in an outpatient clinic?
4. What are annual operating expenditures?
5. What capital expenditures, if any, are there?

Subcategory: Ambulatory Care

6. What is the annual debt service on bond issues?
7. What is the schedule of payments for debt services?

Subcategory: Medical Personnel

1. Are there sufficient physicians to meet new demand?
2. Are there sufficient registered nurses to meet new demand?
3. Are there sufficient licensed practical nurses to meet new demand?
4. Are there sufficient dentists to meet new demand?
5. Are there sufficient medical aides to meet new demand?
6. Are there sufficient pharmacists to meet new demand?
7. Are there sufficient optometrists to meet new demand?
8. Are there sufficient podiatrists to meet new demand?
9. Are there sufficient osteopaths to meet new demand?
10. Are there sufficient pediatricians to meet new demand?
11. Are there sufficient chiropractors to meet new demand?
12. How do population per physician (or other type medical personnel) ratios compare with state or national averages?

HEALTH CARE

I. General Approach

The IPO for health care is divided into five subcategories: acute care, long-term care, emergency medical care, ambulatory care, and medical personnel. These subcategories include four of the major types of health care services and facilities in the U.S. Mental health facilities, a fifth type of health care service, are taken up in the IPO for social services. Medical personnel comprise a fifth subcategory (rather than an element of the other four subcategories) because of the lack of data linking personnel to any specific type of facility.

The demand for health care in rural areas is limited by the capacity of facilities and the availability of health care personnel. Any BLM action resulting in an influx of population to an area will create an increase in the demand for most types of health care services. This is particularly the case where a higher accident rate may be associated with employment generated by a BLM action (e.g., the opening of a mine). However, it is not anticipated that BLM actions in rural areas will have a significant impact on local long-term care facilities because these facilities are primarily utilized by the population aged 65 and over.

The IPO for health care provides the BLM analyst with a framework for assessing the capacity of health care facilities and the availability of health care personnel in relation to the state and to the nation. Existing occupancy rates for acute care and long-term care facilities gauge the degree to which an increased demand for these facilities (i.e., through an increase in population) can be accommodated. Waiting periods and ambulance utilization rates provide similar measures for assessing the adequacy of outpatient clinics and emergency care facilities in meeting the demands of the local population.

To determine the adequacy of the existing health care infrastructure in meeting the needs of an incoming population, the BLM analyst will need to utilize the outputs of the IPO for acute care and long-term care facilities to determine how bed/population ratios change and how they compare with the state and the nation. The outputs for ambulatory care, however, must be utilized in conjunction with those for medical personnel. This is because a large number of ambulatory patients seek medical care in office-based practices. The major constraint to the provision of ambulatory care (in both clinics or in an office-based practice) is the number of physicians and other medical personnel available. Thus, the BLM analyst will find it useful to consider outputs of the medical personnel IPO in assessing the adequacy of local ambulatory care services.

Assessments of the adequacy of local emergency care services are more complex. Unlike the demand for other health care services, which generally rises proportionately with population (as limited by the availability of facilities and personnel), the demand for emergency care facilities is influenced by many factors, including size of population and employment characteristics. Thus, a BLM action resulting in the generation of jobs with high accident rates will have a significant impact on the need for emergency care services in an area. Each state has selected and defined Regional Emergency Medical Services (REMS) regions covering one or more counties with specific plans and guidelines for the provision of emergency health care. The BLM analyst will have to work closely with the REMS staff (usually located at the county seat) to determine the adequacy of existing services and any revisions to or expansions of these services which may be required as a result of an increased demand for emergency care services.

The analyst should be aware of the implications of the data on bed numbers and personnel supplied by the IPO. Other than data on the numbers of beds (by type) no data on supporting equipment are maintained in the IPO. The existence of a (licensed) bed however, suggests the availability of equipment (e.g., respirators, X-ray equipment) to support that bed and the analyst can therefore assume that the basic equipment is available to support existing beds. Also, in the medical personnel subcategory, the analyst should note that all data are in terms of full-time equivalents. Thus, two half-time registered nurses, for example, will be counted as one full-time equivalent.

Finally, the IPO contains no data on the ancillary services supporting the provision of health care. Ancillary services include pharmacies and laboratories which are for the most part privately operated. The provision of these services is expected to be handled in the private market, as suppliers are attracted to the area due to population growth and a resulting expanded market.

II. Assumptions

Rural health care systems differ from metropolitan systems primarily in the wider range of specialists and special facilities available in urban areas. Also, geographic and transportation factors are less of a constraint in urban than in rural areas. Finally, rural areas have a greater difficulty in attracting medical personnel, which hinders attempts to expand health care services.

All data in the IPO chart for health care are at the county level. Specific mappings of the location of health care facilities are also desirable. The location of health care facilities in a rural area can be a severe constraint where large distances must be travelled to visit, for example, an outpatient clinic. The location of emergency care facilities (and the ambulance response time) is critical knowledge when new employment with high accident rates is anticipated.

For all health care subcategories the BLM analyst will find it useful to coordinate efforts at assessing the impacts of a BLM action with county or state departments of health or health systems agencies. Professional planners in these offices will provide much insight into the adequacy of existing systems and the possibilities and mechanisms for expansion or revision of these systems.

III. Standards

Under federal law all states are required to have a Health Systems Plan. These plans provide, with varying levels of detail, guidelines for the provision of health care services. These guidelines include bed/population and physician/population ratios and are to be contained in the IPO. Also, current nationwide ratios are included in the IPO. Comparison of local ratios with those for the state and nation is the primary mechanism available to the BLM analyst in assessing the adequacy of the local infrastructure.

Although the IPO is equipped to handle fairly detailed data, the level of detail of local guidelines varies from area to area. Thus, in some areas it may only be possible to maintain a total bed count rather than a breakdown of beds by type. In the long-term care subcategory, for example, some areas prescribe guidelines on numbers of beds by bed type per population over age 65 while others simply have guidelines on total long-term care beds per 1,000 population over age 65. In the latter case there will be no data in the IPO on bed/population ratios by bed types.

HEALTH CARE: Acute Care Facilities

Geographic Area: County

* indicates the necessity to locate on a map.
Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
1^a	No. of accredited, public and private acute care facilities	* →	No. of accredited, public and private, acute care facilities
1	No. of beds (all types, except bassinets)	→	No. of beds (all types, except bassinets)
1	No. of intensive care beds	→	No. of intensive care beds
1	No. of bassinets	→	No. of bassinets
1	No. of pediatric beds	→	No. of pediatric beds
1	No. of OB-GYN beds	→	No. of OB-GYN beds
1	No. of medical beds	→	No. of medical beds
1	No. of surgical beds	→	No. of surgical beds
1	No. of psychiatric beds	→	No. of psychiatric beds
0 0	No. of intensive care beds Total population	No. of intensive care beds ÷ (no. of population ÷ 1,000)	No. of intensive care beds per 1,000 population
0 0	No. of bassinets No. of women between ages 15 and 45	No. of bassinets ÷ (no. of women aged 15-45 ÷ 1,000)	No. of bassinets per 1,000 women of child-bearing age
0 0	No. of pediatric beds No. of children aged 14 and under	No. of pediatric beds ÷ (no. of children ÷ 1,000)	No. of pediatric beds per 1,000 children
0 0	No. of OB-GYN beds No. of women between ages 15 and 45	No. of OB-GYN beds ÷ (no. of women between ages 15 and 45 ÷ 1,000)	No. of OB-GYN beds per 1,000 adult women

HEALTH CARE: Acute Care Facilities (cont.)

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
0 0	No. of medical beds Total population	No. of medical beds ÷ (total population ÷ 1,000)	No. of medical beds per 1,000 population
0 0	No. of surgical beds Total population	No. of surgical beds ÷ (total population ÷ 1,000)	No. of surgical beds per 1,000 population
0 0	No. of psychiatric beds Total population	No. of psychiatric beds ÷ (total population ÷ 1,000)	No. of psychiatric beds per 1,000 population
2, 3	Total annual admissions	→	Total annual admissions
2, 3	Average length of stay (days)	→	Average length of stay (days)
0 0	Total annual admissions Average length of stay	Total annual admissions x average length of stay	Total patient days per year
0 0	Total patient-days per year Total number of beds	Total patient days ÷ 365 ÷ number of beds	Average daily occupancy rate
4	National intensive care beds/ 1,000 population ratio	→	National intensive care beds/ 1,000 population ratio
5	State intensive care bed/1,000 population ratio	→	State intensive care bed/1,000 population ratio
4	National bassinets/1,000 women of child-bearing age ratio	→	National bassinets/1,000 women of child-bearing ratio
5	State bassinets/1,000 women of child-bearing age ratio	→	State bassinets/1,000 women of child-bearing ratio
4	National pediatric beds/1,000 children aged 16 and under ratio	→	National pediatric beds/1,000 children aged 16 and under ratio

HEALTH CARE: Acute Care Facilities (cont.)

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
5	State pediatric beds/1,000 children aged 16 and under ratio	→	State pediatric beds/1,000 children aged 16 and under ratio
4	National OB-GYN beds/1,000 women aged 16 and over ratio	→	National OB-GYN beds/1,000 women aged 16 and over ratio
5	State OB-GYN beds/1,000 women aged 16 and over ratio	→	State OB-GYN beds/1,000 women aged 16 and over ratio
4	National medical beds/1,000 total population ratio	→	National medical beds/1,000 total population ratio
5	State medical beds/1,000 total population ratio	→	State medical beds/1,000 total population ratio
4	National surgical beds/1,000 total population ratio	→	National surgical beds/1,000 total population ratio
5	State surgical beds/1,000 total population ratio	→	State surgical beds/1,000 total population ratio
4	National psychiatric beds/1,000 total population ratio	→	National psychiatric beds/1,000 total population ratio
5	State psychiatric beds/1,000 total population ratio	→	State psychiatric beds/1,000 total population ratio
5	State acute care facility beds/1,000 population ratio	→	State acute care facility beds/1,000 population ratio
4	National acute care facility bed/ 1,000 population ratio	→	National acute care facility bed/ 1,000 population ratio

HEALTH CARE: Acute Care Facilities (cont.)

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
3	Total annual operating expenditures	→	Total annual operating expenditures
0 0	Total annual operating expenditures Total no. of beds	Total annual operating expenditures ÷ no. of beds	Annual operating expenditure/bed
6	Annual operating expenditures	→	Annual operating expenditures
6	Capital expenditures	→	Capital expenditures
6	Annual debt service on bond issues	→	Annual debt service on bond issues

HEALTH: Acute Care Facilities

Sources

1. County department of health (licensing division or delegated licensing authority) or state department of health or health systems agency (should have a health systems plan).

2. American Hospital Association, Guide to the Health Care Field (updated annually), 1977 Edition, Chicago. Available through American Hospital Association, 840 North Lake Shore Drive, Chicago, Illinois, 60611. This guide includes most hospitals in the U.S. (all those registered with the AHA or the American Osteopathic Hospital Association) and provides by city the names of hospitals, and data on total beds, admissions, average census, occupancy rates, and bassinets.

3. Survey of local hospitals.

4. Contact the American Hospital Association, Office of Research and Statistics, 840 North Lake Shore Drive, Chicago, Illinois, 60611 (312-645-9400)

5. State department of health or health systems agency.

6. Local budget.

0. System output.

HEALTH CARE: Long-Term Faciliites

Geographic Area: County
* indicates the necessity to locate on a map.
Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
1^a	No. of accredited public and private long-term facilities	* →	No. of accredited public and private long-term facilities
1	Total no. of long-term care beds	→	Total no. of long-term beds
1	No. of skilled nursing care beds	→	No. of skilled nursing care beds
1	No. of intermediate nursing care beds	→	No. of intermediate nursing care beds
1	No. of domiciliary nursing care beds	→	No. of domiciliary nursing care beds
0	Total population aged 65 and over	→	Total population aged 65 and over
0 0	No. of long-term care beds Total population aged 65 and over	No. of long-term care beds ÷ (total population aged 65 and over ÷ 1,000)	No. of long-term care beds/1,000 population aged 65 and over
0 0	No. of skilled nursing care beds Total population aged 65 and over	No. of skilled nursing care beds ÷ (total population aged 65 and over ÷ 1,000)	No. of skilled nursing care beds/ 1,000 population aged 65 and over
0 0	No. of intermediate nursing care beds Total population aged 65 and over	No. of intermediate nursing care beds ÷ (total population aged 65 and over ÷ 1,000)	No. of intermediate nursing care beds/1,000 population aged 65 and over
0 0	No. of domiciliary nursing care beds Total population aged 65 and over	No. of domiciliary nursing care beds ÷ (total population aged 65 and over ÷ 1,000)	No. of domiciliary nursing care beds/1,000 population aged 65 and over
2	Total annual admissions	→	Total annual admissions
2	Average length of stay	→	Average length of stay
0 0	Total annual admissions Average length of stay	Total admissions x average length of stay	Total patient days per year

HEALTH CARE: Long-Term Care Facilities (cont.)

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
0 0	Total patient-days per year Total number of beds	Total patient-days ÷ 365 ÷ number of beds	Average daily occupancy rate
3	National long-term care bed/1,000 population over age 65 ratio	→	National long-term care bed/1,000 population over age 65 ratio
1	State long-term care bed/1,000 population over age 65 ratio	→	State long-term care bed/1,000 population over age 65 ratio
3	National skilled nursing care bed/ 1,000 population over age 65 ratio	→	National skilled nursing care bed/ 1,000 population over age 65 ratio
1	State skilled nursing care bed/ 1,000 population over age 65 ratio	→	State skilled nursing care bed/ 1,000 population over age 65 ratio
3	National intermediate nursing care bed/1,000 population over age 65 ratio	→	National intermediate nursing care bed/1,000 population over age 65 ratio
1	State intermediate nursing care bed/1,000 population over age 65 ratio	→	State intermediate nursing care bed/1,000 population over age 65 ratio
1	State domiciliary nursing care bed/1,000 population over age 65 ratio	→	State domiciliary nursing care bed/1,000 population over age 65 ratio
2	Total annual operating expenditures	→	Total annual operating expenditures
0 0	Total annual operating expenditures Total no. of beds	Total annual operating expenditures ÷ total no. of beds	Annual operating expenditures per bed

HEALTH CARE: Long-Term Care Facilities (cont.)

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
4	Annual operating expenditures	→	Annual operating expenditures
4	Capital expenditures	→	Capital expenditures
4	Debt service payments	→	Debt service payments

HEALTH CARE: Emergency Medical Care

Geographic Area: County
* indicates the necessity to locate on a map.
Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
1	No. of rescue centers	* →	No. of rescue centers
1	No. of emergency centers	* →	No. of emergency centers
1^a	No. of emergency rooms	* →	No. of emergency rooms
1	No. of ambulances	→	No. of ambulances
1	No. of emergency four-wheel drive vehicles	→	No. of emergency four-wheel drive vehicles
1	No. of helicopters available for emergency use	→	No. of helicopters available for emergency use
1	Local guideline on maximum response time for ambulance	→	Local guideline on maximum response time for ambulance
1	Average response time for ambulances	→	Average response time for ambulances
1	Average no. of ambulance trips/day	→	Average no. of ambulance trips/day
0 0 0	Average response time for ambulances Average no. of ambulance trips/day No. of ambulances	(Average response time x average no. of trips) ÷ no. of ambulances	Utility rate of ambulances (hours/day)
2	No. of new industrial jobs	→	No. of new industrial jobs
3	Accident rate associated with new jobs	→	Accident rate associated with new jobs
0 0	No. of new industrial jobs Accident rate associated with new jobs	No. of new jobs x accident rate	Potential demand for emergency care generated by new employment

HEALTH CARE: Emergency Medical Care (cont.)

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
4	Annual operating expenditures	→	Annual operating expenditures
4	Capital expenditures	→	Capital expenditures
4	Annual debt service on bond issues	→	Annual debt service on bond issues

HEALTH CARE: Emergency Medical Care

Sources

1. County department of health or regional or state emergency medical services staff. Otherwise a field survey of hospitals will be necessary.

2. Field survey of new industrial employers beginning operations as a result of BLM action.

3. State Department of Labor, Workmen's Compensation Division.

4. Local budget.

0. System output.

HEALTH CARE: Ambulatory Care Facilities

Geographic Area: County
* indicates the necessity to locate on a map.
Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
1^{a}	No. of public and private outpatient clinics	* →	No. of public and private outpatient clinics
1, 2	No. of outpatient clinic examining rooms	→	No. of outpatient clinic examining rooms
2	Average waiting time in outpatient clinic	→	Average waiting time in outpatient clinic
3	Annual operating expenditures	→	Annual operating expenditures
3	Capital expenditures	→	Capital expenditures
3	Annual debt service	→	Annual debt service

HEALTH CARE: Ambulatory Care Facilities

Sources

1. County department of health
2. Survey of local outpatient clinics
3. Local budget.

HEALTH CARE: Medical Personnel

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
1	No. of physicians	→	No. of physicians
1	No. of registered nurses	→	No. of registered nurses
1	No. of licensed practical nurses	→	No. of licensed practical nurses
1	No. of dentists	→	No. of dentists
1	No. of medical aids (paramedics)	→	No. of medical aids (paramedics)
1	No. of pharmacists	→	No. of pharmacists
1	No. of optometrists	→	No. of optometrists
1	No. of podiatrists	→	No. of podiatrists
1	No. of osteopaths	→	No. of osteopaths
1	No. of pediatricians	→	No. of pediatricians
1	No. of chiropractors	→	No. of chiropractors
0 0	No. of physicians Total population	No. of physicians ÷ (total population ÷ 1,000)	No. of physicians per 1,000 population
0 0	No. of registered nurses Total population	No. of registered nurses ÷ (total population ÷ 1,000)	No. of registered nurses per 1,000 population
0 0	No. of licensed practical nurses Total population	No. of licensed practical nurses ÷ (total population ÷ 1,000)	No. of licensed practical nurses per 1,000 population
0 0	No. of dentists Total population	No. of dentists ÷ (total population ÷ 1,000)	No. of dentists per 1,000 population

HEALTH CARE: Medical Personnel (cont.)

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
0 0	No. of medical aids Total population	No. of medical aids ÷(total population ÷ 1,000)	No. of medical aids per 1,000 population
0 0	No. of pharmacists Total population	No. of pharmacists ÷(total population ÷ 1,000)	No. of pharmacists per 1,000 population
0 0	No. of optometrists Total population	No. of optometrists ÷(total population ÷ 1,000)	No. of optometrists per 1,000 population
0 0	No. of podiatrists Total population	No. of podiatrists ÷(total population ÷ 1,000)	No. of podiatrists per 1,000 population
0 0	No. of osteopaths Total population	No. of osteopaths ÷(total population ÷ 1,000)	No. of osteopaths per 1,000 population
0 0	No. of pediatricians Total population	No. of pediatricians ÷(total population ÷ 1,000)	No. of pediatricians per 1,000 population
0 0	No. of chiropractors Total population	No. of chiropractors ÷(total population ÷ 1,000)	No. of chiropractors per 1,000 population
2	National physician/1,000 population ratio	→	National physician/1,000 population ratio
2	State physician/1,000 population ratio	→	State physician/1,000 population ratio
2	National registered nurses/1,000 population ratio	→	National registered nurses/1,000 population ratio
2	State registered nurses/1,000 population ratio	→	State registered nurses/1,000 population ratio

HEALTH CARE: Medical Personnel (cont.)

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
2	National licensed practical nurses/ 1,000 population ratio	→	National licensed practical nurses/ 1,000 population ratio
2	State licensed practical nurses/ 1,000 population ratio	→	State licensed practical nurses/ 1,000 population ratio
2	National dentists/1,000 population ratio	→	National dentists/1,000 population ratio
2	State dentists/1,000 population ratio	→	State dentists/1,000 population ratio
2	National medical aids/1,000 population ratio	→	National medical aids/1,000 population ratio
2	State medical aids/1,000 population ratio	→	State medical aids/1,000 population ratio
2	National pharmacists/1,000 population ratio	→	National pharmacists/1,000 population ratio
2	State pharmacists/1,000 population ratio	→	State pharmacists/1,000 population ratio
2	National optometrists/1,000 population ratio	→	National optometrists/1,000 population ratio
2	State optometrists/1,000 population ratio	→	State optometrists/1,000 population ratio

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
2	National podiatrists/1,000 population ratio	→	National podiatrists/1,000 population ratio
2	State podiatrists/1,000 population ratio	→	State podiatrists/1,000 population ratio
2	National osteopaths/1,000 population ratio	→	National osteopaths/1,000 population ratio
2	State osteopaths/1,000 population ratio	→	State osteopaths/1,000 population ratio
2	National pediatricians/1,000 population ratio	→	National pediatricians/1,000 population ratio
2	State pediatricians/1,000 population ratio	→	State pediatricians/1,000 population ratio
2	National chiropractors/1,000 population ratio	→	National chiropractors/1,000 population ratio
2	State chiropractors/1,000 population ratio	→	State chiropractors/1,000 population ratio

HEALTH CARE: Medical Personnel

Sources

1. Data on numbers of medical personnel by type in the county may be available from the county department of health. If not, it will be necessary to obtain this information through the state department of health.

2. Specialists by state and for the nation are provided in the American Medical Association, Distribution of Physicians (published annually) 535 N. Dearborn Street, Chicago, Illinois 60610 (312-751-6200). For specialists not listed in this publication, write:

   Health Resources Administration
   Bureau of Health Manpower
   Manpower Analysis Branch
   Room 4-41 Center Building
   3700 East-West Highway
   Hyattsville, MD 20782

VIII. LAW ENFORCEMENT

CATEGORY: LAW ENFORCEMENT

Law enforcement includes the activities of policing a community, maintaining a judicial systems of courts and judges, and providing custody and correction facilities.

Subcategory: Police Protection

Police protection includes the functions of patrol crime. Patrol is the routine deployment of police personnel in order to project a peacekeeping presence, obtain intelligence or advance warning of crimes committed or about to be committed, and respond quickly to crimes on other crisis situations. Crime investigation includes dispatch of officers to the site of a newly committed crime pursuit and apprehension of the suspect(s). Crime investigation also involves the use of police personnel and other resources to obtain information useful in the subsequent apprehension and conviction of the perpetrator(s) of a crime. Police traffic supervision and control involves dispatching personnel who supplement traffic signs, signals, parking meters and other devices in ensuring motorist and pedestrian compliance with traffic laws and the orderly, safe flow of traffic in general.

- sworn personnel	(number of full-time equivalent)
- police cars	(number of vehicles)
- other major equipment	(list items)
- police stations	(number of stations, location and capacity)
- operating budget	(dollars per year)

Subcategory: Judicial System

The judicial system comprises both the courts in which civil and criminal cases are tried and judgements rendered, and the public prosecutor's and public defenders functions.

- judges	(number, hours on duty)
- public defenders	(number of attorneys)
- operating budget	(dollars per year)

Subcategory: Custody and Correction

Custody includes both the physical detention of suspects prior to trial and conviction, or of prisoners following conviction. Correction includes supervision of convicted persons undergoing non-detentive correction, as in work-release or parole programs.

CATEGORY: LAW ENFORCEMENT

Subcategory: Custody and Correction (cont.)

- detention facilities (adults)	(prisoner capacity)
- detention facilities (minors)	(prisoner capacity)
- detention personnel	(full-time equivalent personnel)
- non-detentive correction facilities and programs	(list)
- non-detentive correction personnel	(list)
- operating budget	(dollars per year)

CATEGORY: LAW ENFORCEMENT

Subcategory: Police Protection

1. What is the population?
2. How many sworn officers (full-time equivalent) does the department have?
3. How many non-sworn personnel (full-time equivalent) does the department have?
4. How many police cruisers does it have?
5. What other major pieces of equipment (e.g., helicopters, vans) does it have?
6. Does the department have more than one police station?
7. If it has more than one, where are the various stations located?
8. How many personnel (sworn and non-sworn) work at each station?
9. What is the capacity (i.e., number of personnel) of each station?
10. What are the department's annual operating expenditures?
11. What are the department's annual capital outlays (i.e., for buildings or major equipment items)?
12. What are annual debt service payments on police-related debt?
13. How do the number of sworn officers per thousand population compare with any state and/or local standards which exist?
14. How does the ratio of full-time equivalent sworn officers compare with state and/or local guidelines?
15. How does the geographic location and distribution of station houses compare with published guidelines?
16. What is the number of reported crimes per 1,000 population?
17. What is the percent of reported crimes resulting in the arrest of the suspect?
18. What is the percent of arrested suspects tried and found guilty?

Subcategory: Judicial System

1. How many judges does the judicial system employ?
2. On the average, how many hours per week are judges on duty?

CATEGORY: LAW ENFORCEMENT

Subcategory: Judicial System (cont.)

3. How many adult cases were pending at the beginning of the term?
4. How many adult cases were filed during the term?
5. How many adult cases were disposed of by acquittal or dismissal?
6. How many adult cases were disposed of by conviction on offense charged or a lesser offense?
7. How many adult cases were pending at the end of the period?
8. How many juvenile cases were pending at the beginning of the term?
9. How many juvenile cases were filed during the term?
10. How many juvenile cases were disposed of by acquittal/dismissal?
11. How many juvenile cases were disposed of by conviction on offense charged or a lesser offense?
12. How many juvenile cases were pending at the end of the period?
13. Does the community have a system to provide legal assistance to indigents?
14. If so, is the system of the public-defender type or the assigned-counsel type?
15. If it is a public-defender type system, how many full-time equivalent attorneys does the public defender's office have?
16. What is the annual operating budget of the public defender's office?
17. If it is an assigned counsel-type system, how many eligible attorneys are there?
18. How many attorneys accepted assignments during the period?
19. What were total expenditures for assigned counsels' fees?
20. What is the average hourly fee paid to assigned counsels?

MENT

ly and Corrections

1. Does the community have separate detention facilities for adults and juveniles?
2. What is the capacity (number of inmates) of adult detention facilities?
3. What was the number of adult inmates at the beginning of the period?
4. How many adults were admitted during the period?
5. How many adults were released during the period?
6. What is the length of the average adult inmate's detention?
7. What was the number of adult inmates at the end of the period?
8. What was the adult facility's average daily occupancy?
9. What is the capacity (number of detainees) of juvenile detention facilities?
10. How many juvenile detainees were there at the beginning of the period?
11. How many juvenile detainees were admitted during the period?
12. How many juvenile detainees were released during the period?
13. How many juvenile detainees were there at the end of the period?
14. What was the average length per individual detention?
15. What was the average daily occupancy of the juvenile facility?
16. How many full-time equivalent adult detention personnel are there?
17. How many full-time juvenile detention personnel are there?
18. What other non-custodial corrections' facilities are there (e.g., halfway houses)?
19. How many non-custodial corrections officers are there (e.g., parole officers)?
20. What is the corrections department's annual operating budget?

CATEGORY: LAW ENFORCEMENT

Subcategory: Custody and Corrections (cont.)

21. What are the corrections department's annual capital expenditures?

22. What are the corrections department's annual debt service payments?

LAW ENFORCEMENT

I. General Approach

Law enforcement embraces the functions of policing a community, maintaining a judicial system, and providing custody and correction facilities. This category has been divided into three subcategories: 1) police patrol, crime investigation and traffic control activities; 2) the judicial system; and 3) custody and correction. These subcategories are based on functional differences as well as differences in personnel.

Police coverage or capacity is conventionally measured in terms of full-time sworn officers per thousand population. Other measures exist with which to assess the capacity of certain major capital items, i.e., police cruisers and police stations. For example, the available number of cruisers can be compared to the number of sworn officers. The adequacy of existing police station facilities is a function of several variables, including the number of sworn and civilian personnel working there and its location in the community. Rather than individually enumerating items of smaller equipment, such as cameras and two-way radios, this analysis deals with these items in terms of the law enforcement agency's overall operating expenditures.

The capacity of the local judicial system is measured separately for adult and juvenile courts, if possible. It is measured by such factors as the number of judges and the amount of time they are on duty, the caseload and the judges' ability to handle it (i.e., the backlog of cases). The public prosecutor's criminal function, while logically an element under this subcategory, has already been accounted for under the Legal Counsel subcategory of government. Another relevant measure of demand is the number of indigent cases (i.e., defendants in need of counsel but unable to afford a lawyer's fees. Customarily in such cases the court will either assign a private attorney to the case (whose fees are paid by the court on a set pay scale) or assign the case to a public defender (an attorney regularly employed by the government to represent indigent defendants). In an assigned-counsel system, capacity is a function of three factors: the number of local lawyers eligible for assignment; the number of lawyers accepting assignments; and the amount budgeted for assigned counsel's fees. In a public-defender system, capacity is measured in terms of the number of full-time equivalent attorneys on the public defender's staff.

Like the judicial system, the demands on and capacities of the custody and corrections system should be evaluated separately for adult and juvenile facilities when possible. The capacity of detention facilities is measured in terms of the design capacity of the buildings or cell-blocks (i.e., number of inmates). One way of measuring demand is in terms of the average

daily occupancy rate of the facility. Data on prisoner turnover rate and average length of detention are also useful in assessing the implications of a given average daily occupancy rate. For instance, a relatively high average daily occupancy may imply a more immediate need for expansion in a facility with a high turnover rate than in a facility with a relatively stable population of long-term inmates. The implications of a given inmate occupancy rate for future expansion programs should be further discussed with local police and corrections officials. The adequacy of the current detention facility staff should also be evaluated in discussions with local corrections officials.

Uniform standards do not exist for planning non-detentive correctional facilities (e.g., halfway houses), programs (e.g., work-release programs), and staff (e.g., parole officers). Beyond listing non-detentive corrections facilities, programs and personnel, it is left to the analyst to assess their quantitative and qualitative adequacy in conjunction with local law enforcement and corrections authorities.

II. Assumptions

Law enforcement agencies in metropolitan areas rely on a much wider range of sophisticated equipment than those in non-metropolitan areas. Problems of logistics and response time as they relate to the location of police precinct stations are of greater importance in metropolitan than non-metropolitan areas; in the case of the latter there is frequently only one police station. The range of non-detentive correctional programs (halfway houses, work-release, etc.) is frequently also much wider in metropolitan areas. Therefore, in analyzing metropolitan areas it is especially important that the analyst collaborate with local law enforcement officials and planners to determine whether the elements assessed in the IPO charts go far enough in addressing the needs of individual metropolitan areas.

Private firms and, in some cases, individuals may employ security guards or security devices such as alarm systems. However, these private-sector security arrangements generally are not taken into account in determining the adequacy of publicly-provided police protection.

Police coverage should be defined with reference to local agencies providing service and to the service area (e.g., city, county, joint district). Normally, State Highway Police, game wardens and other non-local law enforcement officials should be excluded from the analysis. Judicial and correctional services should be defined with reference to the unit of government providing the service, since service areas may overlap.

In terms of time, capacity of and demand for police and corrective services should be compiled on an annual basis. Data on judicial caseloads may be compiled on an annual basis or on the basis of court sessions, whichever is more applicable.

III. Standards

Several sources of non-binding nationwide averages, standards or guidelines are cited in the notes to the IPO chart (e.g., publications of the National Advisory Council or criminal justice), state and local officials should also be contacted to determine whether they set applicable standards for law enforcement activities.

In some cases (e.g., police operating expenditures), comparisons with other communities can be helpful. However, such inter-community comparisons should always be utilized with caution, since two communities of similar size can have widely different law enforcement requirements due to differences in population density, racial balance and other factors. Local law enforcement officials should always be contacted for guidance in applying broad guidelines or aid in making comparisons to a specific community.

LAW ENFORCEMENT: Police Patrol, Crime Investigation and Traffic Control

Geographic Area: County and municipality
* indicates the necessity to locate on a map.
Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
0	Total population	→	Total population
1	Number of full-time equivalent sworn officers	→	Number of full-time equivalent sworn officers
1	Number of full-time sworn officers	→	Number of full-time sworn officers
1	Number of full-time equivalent non-sworn personnel	→	Number of full-time equivalent non-sworn personnel
1	Number of police cruisers	→	Number of police cruisers
1^a	Other major equipment items (e.g. vans, helicopters)-list	→	Other major equipment items (e.g. vans, helicopters)-list
1	Number/locations of police stations	* →	Number/locations of police stations
1	Personnel capacity, by individual station	→	Personnel capacity, by individual station
1	Number of personnel attached to each station	→	Number of personnel attached to each station
1	Annual operating expenditures	→	Annual operating expenditures
1	Annual capital outlays	→	Annual capital outlays
1	Annual debt service on police-related debt	→	Annual debt service on police-related debt
2	Population, number of full-time equivalent sworn officers, police operational expenditures in neighboring communities with similar demo-graphic/socioeconomic characteristics	→	Population, number of full-time equivalent sworn officers, police operational expenditures in neighboring communities with similar demographic/socioeconomic characteristics

Geographic Area: County and municipality

Source Number	INPUT	PROCESS	OUTPUT
1,3	State/local standards for sworn officers per thousand population	→	State/local standards for sworn officers per thousand population
1,3	Guidelines for ratio of patrol cars/full-time sworn officers	→	Guidelines for ratio of patrol cars/full-time sworn officers
1,3	Guidelines for locating police stations	→	Guidelines for locating police stations
0	Number of full-time equivalent sworn officers	Number of full-time equivalent sworn officers ÷ population x 1,000	Number of full-time equivalent sworn officers per 1,000 population
0	State/local standards for ratio of sworn officers per 1,000 population	Number of full-time equivalent sworn officers per 1,000 population <> ratio in similar communities <> standards	Compare with ratio in other communities or standards
0	Ratio in comparable communities		
		Number of police crusiers ÷ number of full-time equivalent sworn officers	Ratio police cruisers/full-time sworn personnel
0	Guidelines for radio patrol cars/full-time sworn officers	Number of police cruisers ÷ number of full-time equivalent sworn officers <> ratio in comparable communities	Comparison with ratio in other communities
0	Total personnel at each police station	Total personnel at each police station ÷ design capacity of each station	Percent utilization of each police station
0	Annual police operating expenditures in similar sized communities	→	Annual police operating expenditures in similar sized communities

Geographic Area: County and municipality

Source Number	INPUT	PROCESS	OUTPUT
1	Number of reported crimes per 1,000 population	→	Number of reported crimes per 1,000 population
1	Percent of reported crimes resulting in arrest of suspect	→	Percent of reported crimes resulting in arrest of suspect
1	Percent of arrested suspects tried and found guilty	→	Percent of arrested suspects tried and found guilty

LAW ENFORCEMENT: Police Patrol, Crime Investigation and Traffic Control

1. Contacts with local police officials, supplemented if necessary by contact with local fiscal office for expenditons data.

2. U. S. Department of Commerce, Bureau of the Census, Current Population Reports: Population Estimates and Projections (issued annually), series p-25 and p-26 can be used to identify communities with similar populations. The analysis can also supplement current population estimates by contacts with planning officials in other communities to pinpoint other demographic/socioeconomic characteristics held in common. Local police officials in similar communities can then be contacted to ascertain police coverage in terms of full-time sworn officers per 1,000 population and overall operating expenditures.

3. Contacts with/publisher data from state and federal law enforcement agencies. Useful published sources of guidelines include the following:

   National Advisory Council on Criminal Justice Standards and Goals. Report of the National Advisory Council on Criminal Justice Standards and Goals (Washington, D.C.: Government Printing Office #0-557-053, 1974)
   U. S. Law Enforcement Assitance Administration and U. S. Bureau of the Census: Expenditure and Employment Data for the Criminal Justice System, (Washington, D.C., issued annually)

0. System output.

LAW ENFORCEMENT: Judicial System

Geographic Area: Local jurisdiction

Source Number	INPUT	PROCESS	OUTPUT
1	Number of judges	→	Number of judges
1	Average hours per week judges on duty	→	Average hours per week judges on duty
1	Adult cases pending at beginning of term	→	Adult cases pending at beginning of term
1	Adult cases filed during period	→	Adult cases filed during period
1	Adult cases acquitted/dismissed during term	→	Adult cases acquitted/dismissed during term
1	Adult cases resulting in conviction of offense charged/lesser offense	→	Adult cases resulting in conviction of offense charged/lesser offense
1	Adult cases pending at end of period	→	Adult cases pending at end of period
1	Juvenile cases pending at beginning of period	→	Juvenile cases pending at beginning of period
1	Juvenile cases filed during period	→	Juvenile cases filed during period
1	Juvenile cases acquitted/dismissed during period	→	Juvenile cases acquitted/dismissed during period
1	Juvenile cases resulting in conviction of offense charged/lesser offense	→	Juvenile cases resulting in conviction of offense charged/lesser offense
1	Juvenile cases pending at end of period	→	Juvenile cases pending at end of period

LAW ENFORCEMENT: Judicial System (cont.)

Geographic Area: Local jurisdiction

Source Number	INPUT	PROCESS	OUTPUT
1	Type of indigent defense (e.g., public defender or assigned counsel	→	Type of indigent defense (e.g., public defender or assigned counsel)
1	If assigned counsel system, number of eligible attorneys	→	If assigned counsel system, number of eligible attorneys
1	If assigned counsel system, number of accepting attorneys	→	If assigned counsel system, number of accepting attorneys
1	If assigned counsel system, expenditures for indigent defense	→	If assigned counsel system, expenditures for indigent defense
1	If assigned counsel system, average hourly fee paid accepting attorneys	→	If assigned counsel system, average hourly fee paid accepting attorneys
1	If public defender system, number of full-time equivalent attorneys	→	If public defender system, number of full-time equivalent attorneys
1	If public defender system, annual operating budget of public defender's office	→	If public defender system, annual operating budget of public defender's office

LAW ENFORCEMENT: Judicial System

Sources

1. Contacts with local court officers.

Geographic Area: Local jurisdiction

Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
1^{a}	Capacity (number of inmates) of adult detention facility	→	Capacity (number of inmates) of adult detention facility
1	Number of adult inmates at beginning of period	→	Number of adult inmates at beginning of period
1	Number of adults admitted during period	→	Number of adults admitted during period
1	Number of adults discharged during period	→	Number of adults discharged during period
1	Number of adult inmates at end of period	→	Number of adult inmates at end of period
1	Average daily occupancy rate of adult facility	→	Average daily occupancy rate of adult facility
1^{a}	Capacity (number of inmates) of juvenile detention facility	→	Capacity (number of inmates) of juvenile detention facility
1	Number of juvenile detainees at beginning of period	→	Number of juvenile detainees at beginning of period
1	Number of juveniles admitted during period	→	Number of juveniles admitted during period
1	Number of juveniles released during period	→	Number of juveniles released during period
1	Number of juvenile inmates at end of period	→	Number of juvenile inmates at end of period
1	Average daily occupancy of juvenile facility	→	Average daily occupancy of juvenile facility

LAW ENFORCEMENT: Custody and Conviction (cont.)

Geographic Area: Local jurisdiction.
Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
1	Number of full-time equivalent adult detention personnel	→	Number of full-time equivalent adult detention personnel
1	Number of full-time equivalent juvenile detention personnel	→	Number of full-time equivalent juvenile detention personnel
1[a]	Other non-custodial corrections facilities	→	Other non-custodial corrections facilities
1	Other non-custodial corrections personnel	→	Other non-custodial corrections personnel
1	Annual corrections department annual budget	→	Annual corrections department annual budget
1	Annual corrections department capital expenditures	→	Annual corrections department capital expenditures
1	Annual corrections department annual debt service	→	Annual corrections department annual debt service

LAW ENFORCEMENT: Custody and Conviction

Sources

1. Contact with local correction authorities.

IX. PUBLIC HOUSING

CATEGORY: PUBLIC HOUSING

Subsidized housing for lower and moderate income households provided by a public housing authority or other governmental agency acting as a public housing authority. Public housing authorities or other public agencies exercising the powers of a public housing authority have the power to construct, buy, sell, lease, rent, and/or manage housing to low and moderate income families.

Subcategory: Renter-Occupied Public Housing

Public housing that is rented or leased to low and moderate income households.

- renter-occupied unit (number of units)

Subcategory: Owner-Occupied Public Housing

Public housing that is sold to the household occupying the housing.

- owner-occupied unit (number of units)

CATEGORY: PUBLIC HOUSING

1. Does a public housing authority exist?
2. Does a government agency functioning as a public housing authority exist?
3. If not, have steps been taken to create such an agency?

Subcategory: Renter-Occupied Public Housing

1. How many renter-occupied public housing units exist?
2. How many renter-occupied public housing units are under construction?
3. For the past year, what has been the average number of vacant renter-occupied units?
4. For the past year, what has been the average vacancy rate for these renter-occupied units?
5. For the past year, what has been the average number of households on waiting lists for available renter-occupied units?
6. How does the average number of households on waiting lists compare with the number of existing renter-occupied units?
7. When renter-occupied units under construction are available for occupancy, how much of the demand for these units will remain unmet?
8. What has been the increase in the number of persons receiving public assistance in the past year?
9. What has been the increase in the number of persons receiving public assistance in the past five years?

Subcategory: Owner-Occupied Public Housing

1. How many owner-occupied units of public housing exist?
2. How many owner-occupied units of public housing are under construction?
3. For the past year, what has been the average number of vacant owner-occupied units?
4. For the past year, what has been the average vacancy rate for owner-occupied units?
5. For the past year, what has been the average number of households on waiting lists for owner-occupied units?
6. How does the average number of households on waiting lists compare with the number of existing owner-occupied units?

7. When the owner-occupied units now under construction are available for occupancy, how much of the demand for these units will remain unmet?

8. What has been the increase in the number of persons receiving public assistance in the past year?

9. What has been the increase in the number of persons receiving public assistance in the past five years?

PUBLIC HOUSING

I. General Approach

Public housing has been defined as subsidized housing provided by a public housing authority or other government agency acting as a public housing authority for the benefit of low and moderate income households. This housing is quite often subsidized by the federal government, although the subsidies may come from local or state governments or a combination of governments. The definition has been restricted to that housing provided through a public agency for two reasons: 1) this definition conforms to the standard definition of public housing as used by housing officials and other professionals, and 2) such a definition facilitates collection and analysis of relevant data. Specifically excluded from this definition is a range of subsidized housing serving a similar target group but utilizing subsidies provided to private developers, non-profit organizations, occupants of the housing, or other non-governmental entities. Thus programs for "235" housing, "221 d 3" housing, so-called "rent stamps," and other subsidy programs are excluded from this definition of public housing.

The question of institutional prerequisites is included under each sub-category as an indicator of local interest in and capability of providing public housing. If there is no public agency in municipal or county government to provide for public housing, or if there is no clear assurance that such an agency will be created, then the question of BLM actions affecting public housing is moot. There will be no impact on public housing as defined for this project.

This does not mean that BLM actions will not potentially affect households eligible for public housing. Should BLM actions induce a significant in-migration of new households to an area where vacant housing is in short supply, the cost of housing is likely to rise. This could mean a reduction in the amount of low and moderate income housing available in the area. Public housing is but one of a number of ways of providing low and moderate income housing. Without a public housing authority or analogous agency in place the need for low and moderate housing will almost certainly be met by other means.

The subcategories of renter-occupied and owner-occupied public housing have been included as separate items because of the differences between households occupying each type of housing and the relative availability of each type of housing. In general it would be expected that owner-occupied households would be more stable, would include a higher proportion of families, and would occupy the housing unit for longer periods of time. Owner-occupied units would be expected to account for only a minor share of all public housing. Consequently one would

assume that BLM actions would have less impact on owner-occupied public housing than on renter-occupied public housing.

Capacity for either type of housing is measured in housing units. Housing units are usually further defined by the number of bedrooms in each unit; this is particularly true for renter-occupied units. Measurement at the level of number of housing units, however, should suffice for this project. Adequacy of capacity is indicated by vacancy rates for public housing and by the number of households on waiting lists for public housing. For all types of housing a vacancy rate of five percent for renter-occupied units and one percent for owner-occupied units is the accepted standard.[1] Such vacancy rates allow for a broader range of choice for those seeking housing and facilitate the turnover process in the housing stock. Thus the vacancy rates for public housing should indicate whether or not there is a sufficient supply of this type of housing. Vacancy rates exceeding the accepted standards would indicate an oversupply of public housing and the capacity to absorb increased demand for public housing. Vacancy rates below the accepted standards or the existence of waiting lists for public housing would indicate an undersupply of public housing and potential or real inabilities to absorb any increased demand.

Given sufficient time and resources, demand for public housing is computed as a subset of the demand for all housing. Public housing attempts to serve that part of the housing market that is not or cannot be reasonably served by the private market. If the private housing market cannot provide new or used housing of acceptable quality[2] at a price that low and moderate income households can afford,[3] then there is a need for

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[1] These vacancy rates are used by housing analysts, developers and others in the housing field. They are cited and discussed in Regional Housing Planning: A Technical Guide, prepared for the American Institute of Planners by Hammer, Siler, Greene Associates, March, 1977, p. 7.

[2] Acceptable quality is not well defined, and changes as general expectations about the quality of life increase. Minimal acceptable quality is defined as structural soundness and operating plumbing. For low and moderate income households proximity to place of employment is often a key criterion for acceptability. The definition of minimum housing quality was used in the 1960 U.S. Census, but dropped from the 1970 U.S. Census because of problems in collecting consistent data. For a discussion of housing quality see Ibid, pp. 65-67.

[3] Generally, up to 25 percent of gross income is considered an affordable expenditure for housing; 35 percent of gross income is considered a maximum acceptable expenditure. As with vacancy rates, these figures represent generally accepted industry-wide standards.

government to provide some subsidized housing, possibly including public housing. The specific need for public housing depends on the severity of the need for subsidized housing, the ability of other forms of subsidized housing to meet the needs of low and moderate income householders, and the willingness of local governments to provide public housing.

For this project, proxy measures of demand will be used in the IPO charts. These measures bypass the development of a complete housing market analysis and seek to focus solely on public housing. The demand for public housing is measured by the vacancy rate or the number of households waiting for public housing as described above. A general indication of the changes in demand for public housing is given by changes in the number of persons receiving public assistance. Significant increases in the past year in public assistance recipients or significant increases in the past year as compared to the past five years would indicate potential increases in the demand for public housing and whether or not the rate of increase for the past year was disproportionately large.

While these measures of demand replace more specific measures requiring more time and effort to develop, the need for more accurate measures is obviated by the negligible potential for BLM actions to affect public housing. BLM actions may induce an influx of new workers to an area and create a demand for new housing. Because the workers would probably not qualify for public housing on the basis of income, their demand for housing would have to be met by the private housing market. Such an influx of workers could lead to an inflation of housing prices and a general scarcity of housing, creating problems for existing residents and those on fixed incomes. Although the need for public housing depends somewhat on housing costs, it is primarily a function of the population size of low and moderate income households. BLM actions may well impact the former, but are unlikely to impact the latter.

Indirectly increased housing costs may affect low and moderate income households, as described above, particularly when they seek new residences within affected areas or when their housing costs are increased. Any increase in general housing costs would, on the other hand, tend to slow the turnover rate among low and moderate income homeowners and thus decrease this indirect effect. For low and moderate income renters housing costs may increase if landlords are able to increase rents. In this case the demand for low and moderate income rental housing, including public housing, would increase relative to the supply.

II. Assumptions

In non-metropolitan areas relatively few public housing authorities exist; consequently, there is very little public housing. Thus, for the

majority of areas under discussion, the question of impacts on public housing will not apply.

Should the issue of BLM impacts on public housing apply, the chief agency involved would be the public housing authority or analogous public agency responsible for developing and managing the public housing for the appropriate local jurisdiction. Any new development of public housing could involve local planning boards and/or zoning boards which may have to approve the plans for such housing, particularly its location. Private agencies would not be significantly involved, although private counseling and referral agencies could provide low and moderate income persons with help in obtaining public housing once it has been developed. Any planning for public housing by BLM or local agencies would have to include the active participation of the public housing authority.

Public housing authorities are established by units of local government. Thus the smallest geographical area would be an incorporated municipality; the largest would be a county. The population eligible for public housing would then be defined either as residents of an incorporated municipality or a county.

In determining the existing supply of and demand for public housing, data would be collected at either the municipal or county level. Housing markets are subject both to annual cycles and long-term trends. Data, except where otherwise noted, should be collected on an average annual basis, and data on multi-year trends will increase understanding of the local housing market.

III. Standards

As stated earlier, the existence of public housing is a function of local housing markets and the willingness of local governments to provide public housing. Because of the significant variability of these two elements, the ability to apply data from semmingly comparable areas can be quite limited. For the same reason, standards based on consideration of population or some other universally applicable variable would not be useful within the framework of this type of analysis.

PUBLIC HOUSING: Owner-Occupied Public Housing
Renter-Occupied Public Housing

Geographic Area: Data collected at municipal level and at county level for unincorporated areas.

Source Number	INPUT	PROCESS	OUTPUT
1	Name of public housing authority	→	Name of public housing authority
1	Name of governmental agency acting as a public housing authority	→	Name of governmental agency acting as a public housing authority
2	No. renter-occupied units	→	No. renter-occupied units (existing stock)
2	No. renter-occupied units under construction	→	No. renter-occupied units to be added to existing stock
2	Average No. vacant renter occupied units during past year	→	Average no. vacant renter-occupied units during past year
2	Average No. vacant units No. renter-occupied units	Average no. vacant units ÷ no. renter-occupied units	Average vacancy rate for past year
2	Average No. households on waiting list for renter-occupied units	→	Unmet demand for renter-occupied units
2	Average No. households on waiting list for renter-occupied units No. renter-occupied units	Average no. households on waiting list ÷ no. of renter-occupied units	Rate of unmet demand for renter-occupied units
2	Average No. households on waiting list for renter-occupied units No. renter-occupied units under construction	Average no. households on waiting list for renter-occupied units - no. renter-occupied units under construction	Remaining unmet demand for renter-occupied units after additions to existing stock
3	No. persons currently receiving public assistance No. persons receiving public assistance one year ago	No. persons currently receiving public assistance ÷ no. persons receiving public assistance one year ago	Percentage increase (decrease) in low income persons in last year

PUBLIC HOUSING: Owner-Occupied Public Housing
Renter-Occupied Public Housing

Geographic Area: Data collected at municipal level and at county level for unincorporated areas.

Source Number	INPUT	PROCESS	OUTPUT
3	No. persons currently receiving public assistance No. persons receiving public assistance five years ago	No. persons currently receiving public assistance ÷ no. persons receiving public assistance five year ago	Percentage increase (decrease) in low income persons over past five years
2	No. owner-occupied units	→	Existing stock of no. owner-occupied units
2	No. owner-occupied units under construction	→	No. owner-occupied units to be added to existing stock
2	Average no. vacant owner-occupied units during past year	→	Average no. vacant owner-occupied units during past year
2	Average no. vacant units No. owner-occupied units	Average no. vacant units ÷ no. owner-occupied units	Average vacancy rate for past year
2	Average no. households on waiting list for owner-occupied units	→	Unmet demand for owner-occupied units
2	Average no. households on waiting list for owner-occupied units No. owner-occupied units	Average no. households on waiting list ÷ no. owner-occupied units	Rate of unmet demand for owner-occupied units
2	Average no. households on waiting list for owner-occupied units No. owner-occupied units under construction	Average no. households on waiting list for owner-occupied units - no. owner-occupied units under construction	Remaining unmet demand for owner-occupied units after additions to existing stock

PUBLIC HOUSING: Owner-Occupied Public Housing
Renter-Occupied Public Housing
Sources

1. Local source (local government executive or administrator).

2. Local source (local public housing authority or analogous agency).

3. Local source (local public assistance or welfare agency).

X. RECREATION

CATEGORY: RECREATION

Recreation consists of those pursuits, both active and passive, engaged in during leisure time.

Subcategory: Passive Leisure Pursuits

Passive leisure pursuits consist of events such as cultural and social activities and spectator sports engaged in during leisure time.

- community centers	(number) (person capacity) (number of activities) (square feet)
- auditoriums	(number) (seating capacity) (square feet)
- performing arts facilities	(number) (seating capacity) (square feet)
- museums	(number) (person capacity)
- operating budget	(dollars per year)

Subcategory: Active Leisure Pursuits

Active leisure pursuits include both traditional group games (e.g., baseball, tennis, etc.) and noncompetitive activities performed by an individual or a group (e.g., hiking, fishing, etc.).

- recreational areas	(number of parks) (acres of parks) (miles of shoreline) (number of scenic areas) (number of natural areas) (acres of natural areas)
- outdoor recreation facilities (e.g., athletic fields; playgrounds/tot lots; nature and hiking trails; jogging trails, bike trails; picnic areas; developed camp sites; golf courses, horseback trails; ORV areas; track and field facilities; courts-tennis; basketball; boating areas swimming pools, marinas, etc.)	(number) (person capacity) (acres or square feet)

Subcategory: Active Leisure Pursuits (Cont.)

- indoor recreation facilities (e.g., gymnasium, arenas; skating rinks; courts: tennis, handball, racquetball, basketball, etc.)	(number) (person capacity) (square feet)
- fishing	(acres or miles of fishable waters) (fishermen days) (number of days in fishing season) (fisherman density)
- hunting	(acres of hunting lands) (hunter days) (number of days in hunting season) (hunter density) (accident rate)
- operating budget	(dollars per year)

CATEGORY: RECREATION

Subcategory: Passive Leisure Pursuits

1. What is the number of facilities in the area?
2. What are the capacity levels (measured in total persons) for each of these facilities?
3. What are the physical areas (measured in square feet) of the facilities?
4. What are ratios between size and number of facilities and local population?
5. How accessible are these facilities to the local population? What is the average travel distance or travel time to these facilities?
6. What are attendance rates at these facilities?
7. Are there noticeable levels of overcrowdedness or congestion at these facilities? Crowdedness can be measured in terms of waiting times, number of persons turned away or refused access, or ratio of usage levels (attendance) to existing capacity.
8. How do the local ratios for number and size of facilities compare with current state ratio and professional standards?
9. What are annual operating expenditures?
10. What are capital expenditures, if any, are there?
11. What is the annual debt service on bond issues?
12. What is the schedule of payments for debt service?

Subcategory: Active Leisure Pursuits

1. What is the number of recreational areas in the region?
2. What is the size (in terms of acres or miles) for each of these areas?
3. What types of facilities are there to enhance these areas?
4. What is the capacity of these facilities?
5. What are ratios of number and size of sport facilities to local population?
6. What are the attendance (or participation) rates at these facilities?

Subcategory: Active Leisure Pursuits (Cont.)

7. How accessible are these facilities to the local population? Are they centrally located? What is travel distance (miles), or travel time (minutes), to these facilities?

8. Are there noticeable levels of congestion or overcrowdedness at these facilities? Crowdedness can be measured in terms of waiting times, number of persons turned away or refused access, or the ratio of usage levels (attendance) to exiting capacity.

8. What are the numbers and rates of accidents and/or injuries at these facilities?

9. How do these accident rates compare with state or national rates?

10. How do the size and number of recreation facilities/population ratios compare with both current state levels and professional standards?

11. What are the total number of hunting and fishing acres in the area? ?

12. What are the numbers of days in the local hunting and fishing seasons? ?

13. What are the total number of hunter, and fishermen days in the area? ?

14. What are the average number of local acres per hunter and fisherman per day (or hunter and fisherman density levels)? ?

15. How does the local hunter and fisherman density level compare with the state level and professional standards? ?

16. What are the number and rate of local hunting accidents?

17. How does the local hunting accident rate compare with state and national ratios?

18. What are annual operating expenditures?

19. What are capital expenditures?

20. What is the annual debt service on bond issue?

21. What is the schedule of payments for debt service?

RECREATION

I. General Approach

For the purposes of this analysis, recreation has been defined as those pursuits, both active and passive, engaged in during leisure time. Two broad subcategories are included under recreation: passive leisure pursuits and active leisure pursuits. Passive leisure pursuits include forms of entertainment which are provided or supported by a local or county government for use by the general public. Active leisure pursuits include indoor and outdoor recreation activities such as participatory sports, hunting, fishing, and non-competitive activities such as hiking or camping. The IPO charts present the information categories for determining capacity of and demand for recreation services, and quality of these services. Capacity is measured in terms of maximum number of persons that facilities can accommodate at a given time. Demand is determined either directly, in terms of attendance or participation rates at facilities or indirectly, through growth in population or income levels. Although precise means of measuring quality of a recreational facility are difficult to determine, information on accessibility (distance travelled), overcrowdedness, accident rates, and variety of facilities can be useful in providing some indication of service quality. After reviewing the IPO charts, the BLM analyst should have the sufficient information to determine the general adequacy of recreation facilities in the area. Since recreation is a major BLM program management activity, inadequate recreational facilities may indicate a need for significant BLM involvement in local recreational planning. This might include the development of specific recreational sites on public lands to supplement the recreational facilities in the community and/or financial or technical assistance in the development of facilities within the community.

II. Assumptions

Several important assumptions should be considered in assessing recreational services. First, there will probably be a significant variation in types of and demands on recreational facilities in rural and urban areas. Whereas the former might be oriented toward outdoor activities (e.g., regional parks, ORV areas, hunting, fishing, camping, etc.), urban areas have limited open space and would thus have more compact recreational facilities (e.g., playgrounds, basketball courts, gymnasiums, etc.). Accordingly, the BLM analyst should consider the specific types of recreational activities preferred in the local area.

This analysis does not include commercial recreational facilities or those provided by the private sector. As shown, there are numerous types of public recreation, which should be of primary concern to local and BLM planners. If a sufficient demand for commercial recreation exists in an area (e.g., movies, bowling alleys, etc.), it probably will be handled by the private sector.

Since different types of recreational sites could be scattered through an area, a planner should know the location of all sites. Location is a key factor in determining the accessibility of a facility to the local population. If the sites are shown on a map, the planner can estimate the travel distance (miles) or travel time (minutes) to these facilities.

The demand for various recreational activities can be highly seasonal in nature (e.g., gymnasium usage during the winter, camping and softball during the summer). Thus, for each type of activity in the area the planner should collect data on attendance or participation levels for both annual and peak season usage. This information can then be compared with facility capacity levels to determine actual vs. capacity utilization levels.

III. Standards

A number of standards and guidelines are available for assessing local recreation services. The National Recreation and Park Association and the Bureau of Outdoor Recreation (Department of Interior) are the most frequently cited sources for recreation and open space standards. In addition, the Outdoor Recreation Plans of individual states contain similar information on standards which would be useful to the analyst. These standards are designed primary as guidelines for 1) developing a unified and balanced systems of park and recreation areas and a systematic approach to land acquisition, and 2) developing a measure against which the effectiveness of the local park and recreation system can be evaluated. However, the standards are not intended to be binding upon the community. The planner should also consider such factors as climate, population characteristics, social and economic factors, local traditions, etc., when evaluating recreation standards for a particular community. Finally, if the standards are to be useful, they must reflect the needs of the people in the specific area being served.

RECREATION: Passive Leisure Pursuits

Geographic Area: County or local jurisdiction
* indicates the necessity to locate on a map.
Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
1^{a}	Number of community centers	* →	Number of community centers
1^{a}	Number of auditoriums	* →	Number of auditoriums
1^{a}	Number of performing art facilities	* →	Number of performing art facilities
1	Number of museums	* →	Number of museums
		Number of community center + auditoriums + performing art facilities + museums	Total number of local public entertainment facilities
2	Total local population	Number of facilities ÷ population	Ratio of number of facilities to local population
1	Total person capacity of facilities	Total person capacity of facilities ÷ number of facilities	Average capacity of a facility
1	Total physical size of facilities	Total size of facilities ÷ number of facilities	Average size of a facility
1 1	Distance to public facilities Local speed limits	Average distance to facilities ÷ speed limits	Average travel time to a facility
1	Attendance levels at facilities	Attendance levels ÷ person capacities at facilities	Utilization levels of facilities
1	Average waiting time per person per facility	Average waiting time per person ÷ number of facilities	Average waiting time per person at each facility
0	Total number of facilities in state ÷ population	Ratio of number of state facilities to state population	Comparison of local and state ratios of number of facilities to population

RECREATION: Passive Leisure Pursuits (Cont.)

Geographic Area: County or local jurisdiction

Source Number	INPUT	PROCESS	OUTPUT
0	Total number of persons refused access to facilities	Persons refused access ÷ attendance levels	Ratio of potential spectators to actual spectators
3	Total size of facilities in the state/number of facilities in the state	Average size of facility in the state	Comparison of the average size of a facility at the local and state levels
4	Professional standards for ratio of the number of facilities to population	→	Comparison of the local ratio of number of facilities to population with professional standards
4	Professional standards for average size of facilities	→	Comparison of average size of local facilities with professional standards
5	Annual operating expenditures	→	Annual operating expenditures
5	Capital expenditures	→	Capital expenditures
5	Annual debt service on bond issues	→	Annual debt service on bond issues

RECREATION: Passive Leisure Pursuits

Sources

1. Primary contact with the professional staff of local or County Recreation Departments.

2. Bureau of Census, Census of Population, U. S. Department of Commerce, Washington, D. C. For small unincorporated towns or villages, population estimates are generally available from County Planning Departments of County Commissioners Office.

3. Primary contact with professional staff of State Park and Recreation Departments. Information also might be contained in Annual State Recreation Reports or State Recreation Plans.

4. Buechner, Robert D. National Park, Recreation and Open Space Standards, National Recreation and Park Association, 1970 and National Recreation Association. Evaluation of Community Recreation: A Guide to Evaluation with Standards and Evaluation Criteria, 1965. Additional information is available through direct contact with representation of the National Recreation and Park Association, Arlington, Virginia.

5. Local budget.

0. System output.

RECREATION: Active Leisure Pursuits

Geographic Area: County or local jurisdiction
* indicates the necessity to locate on a map.
Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
1	Number of parks	* →	Number of parks
1	Total park size	→	Total park size
1	Length of shoreline	* →	Length of shoreline
1	Number of scenic areas	→	Number of scenic areas
1	Number of natural areas	→	Number of natural areas
1	Total natural area size	→	Total natural area size
1	Number of outdoor recreation facilities	* →	Number of outdoor recreation facilities
1^a	Number of indoor recreation facilities	* →	Number of indoor recreational facilities
2	Total local population	Number of recreation facilities ÷ local population	Ratio of number of recreation facilities to local population
1	Total person capacity of recreation facilities	Total capacity of recreation facilities ÷ number of facilities	Average capacity of a recreation facility
1	Total area of recreation facilities	Total area of recreation facilities ÷ number of facilities	Average size of a recreation facility
1 1	Distance to recreation facilities Local speed limit	Average distance to recreation facilities ÷ speed limit	Average travel time to facilities
1	Attendance levels at receation facilities	Attendance levels ÷ person capacities of recreation facilities	Utilization levels of recreation facilities

RECREATION: Active Leisure Pursuits (Cont.)

Geographic Area: County or local jurisdiction

Source Number	INPUT	PROCESS	OUTPUT
1	Average waiting time per person at each facility	→	Average waiting time per person at each facility
1	Total number of persons refused access	Persons refused access ÷ attendance levels	Ratio of potential participants to actual participants
1	Accident rates at local recreation facilities	→	Accident rates at local sport facilities
3	National accident rates at recreation facilities	Local accident rates <> national accident rates	Comparison of local and national accident rates
4	Number of recreation facilities in state ÷ state population	Ratio of number of sport facilities in the state to state population	Comparison of local and state ratios of number of recreation facilities to population
4	Total size of recreation facilities in state ÷ number of facilities in the state	Average size of recreation facilities in the state	Comparison of average size of recreation facilities at the local and state levels
5	Professional standards for the ratio of recreation facilities to population	→	Comparison of local ratio of number of recreation facilities to population with professional standards
5	Professional standards for average size of recreation facilities	→	Comparison of average size of local recreation facilities with professional standards
4	Number of local hunting acres	→	Number of local hunting acres
4	Number of local fishing acres	→	Number of local fishing acres

Geographic Area: County or local jurisdiction

Source Number	INPUT	PROCESS	OUTPUT
4	Days in hunting season	→	Days in hunting season
4	Days in fishing season	→	Days in fishing season
4	Total number of local hunter days	Total local hunting days ÷ length of season	Average number of hunters per day
4	Total number of local fishermen days	Total local fishermen days ÷ length of season	Average number of fishermen per day
4	Number of hunters per day	Number of local hunting acres ÷ number of hunters per day	Local hunter density levels
4	Number of fishermen per day	Number of local fishing acres ÷ number of fishermen per day	Local fishermen density levels
4	State hunter density levels	→	Comparison of state and local hunter density levels
4	State fisherman density levels	→	Comparison of state and local fishermen density levels
5	Professional standards for hunter density levels	→	Comparison of professional standards and local hunter density levels
5	Professional standards for fishermen density levels	→	Comparison of professional standards and local fishermen density levels
1	Number of local hunting accidents	Number of local hunting accidents ÷ total number of local hunter days	Ratio of local hunting accidents to hunter days
4	State hunting accident rates	→	Comparison of local and state hunting accident rates

RECREATION: Active Leisure Pursuits (Cont.)

Geographic Area: County or local jurisdiction

Source Number	INPUT	PROCESS	OUTPUT
3	National hunting accident rates	→	Comparison of local and national hunting accident rates
6	Annual operating expenditures	→	Annual operating expenditures
6	Capital expenditures	→	Capital expenditures
6	Annual debt service on bond issues	→	Annual debt service on bond issues
6	No. of hunting licenses issued annually	→	No. of hunting licenses issued annually
6	No. of fishing licenses issued annually	→	No. of fishing licenses issued annually

RECREATION: Active Leisure Pursuits

Sources

1. Primary contact with the professional staff of local or County Recreation Departments. Information also might be presented in Annual State Recreation Reports or State Recreation Plans.

2. Bureau of Census, Census of Population, U. S. Department of Commerce, Washington, D. C. For small unincorporated towns or villages, population estimates are generally available from County Planning Departments or County Commissioners Office.

3. National Safety Council, Annual Accident Facts, Chicago, Ill. This publication is published each year. More detailed information of national accident rates can be obtained through direct contact with representation of the Statistics Section of the National Safety Council in Chicago.

4. Primary contact with professional staff of State Park and Recreation Departments. Information also might be contained in Annual State Recreation Reports of State Recreation Plans.

5. Buechner, Robert D. National Park, Recreation and Open Space Standards, National Recreation and Park Association, 1970 and Bureau of Outdoor Recreation, U. S. Department of the Interior. Outdoor Recreation Space Standards, 1967 and National Recreation and Park Association. Outdoor Recreation Space Standards, September 1967 and the Outdoor Recreation Plans of Individual States.

6. Local budget.

0. System output.

XI. SEARCH AND RESCUE

CATEGORY: SEARCH AND RESCUE (SAR)

Search and rescue is the employment of available personnel and facilities in rendering aid to persons and property in distress.

Subcategory: Search and Rescue

Search and rescue is defined as the employment of available personnel and facilities in rendering aid to persons and property in distress.

- search and rescue organizations	(number of organizations) (geographically defined area [size] of SAR coordination responsibility)
- search and rescue resources	(size of professional staff) (size of volunteer staff) (number of transportation vehicles) (annual operating expenditures)
- search and rescue communications	(annual operating expenditures)

CATEGORY: SEARCH AND RESCUE (SAR)

Subcategory: Search and Rescue (SAR)

1. What organization has primary legal responsibility for SAR activities in the local area?
2. What are the geographic boundaries of the primary SAR organization?
3. What other local organizations are engaged in SAR activities?
4. What is the size of the SAR professional staff?
5. What is the size of the SAR volunteer staff?
6. What is the number of SAR transportation vehicles (e.g., cars, jeeps, boats, helicopters, fixed wing aircraft, etc.) available to the local SAR organization?
7. What are the annual operating expenditures allocated to local search and rescue operations (e.g., personnel, equipment and facilities)?
8. What type or types of SAR communication systems are utilized in the local area?
9. What is the annual operating expenditures allocated to SAR communication systems in the local area?
10. What is the time/distance response factor of the SAR operation? Or, in what amount of time can the SAR operation cover a specific area of land?

SEARCH AND RESCUE (SAR)

I. General Approach

Search and rescue (SAR) is defined as the employment of available personnel and facilities in rendering aid to persons and property in distress. For this analysis, SAR consists primarily of the activities involved in locating missing or stranded persons. If emergency medical services are required in SAR activities these will be handled by the local health care organizations (see Health Care). Since SAR operations perform a single common service, only one subcategory was contained under this category. Given the diverse types of SAR operation (e.g., persons trapped in caves, mines, mountain areas, avalanches; highway and railway accidents; civil disasters such as bridge collapses, etc.), it is not possible accurately to define or compare capacity levels for operations. Moreover, established methods have not been developed of calculating the demand for SAR operations. An area with many attractive recreational sites, visited by many tourists during the summer months, probably has a higher demand for SAR operations than a less attractive, infrequently visited area. However, this assumption is highly qualitative and may vary with specific local conditions. For example, if there is sufficient personnel to patrol a large, popular recreation area, the need for SAR operations might decline. The performance capability of an operation is partially determined by its time/distance response factor. This factor measures the operations ability to contact and communicate information to all SAR units scattered through the search area. However, few local communities or counties have attempted to determine the response factor of their SAR operation. Thus, this information will not be available to assist local planners.

The IPO chart essentially provides an overview of SAR system in the local area. It provides little information on the capacity of and demand for SAR operations. Accordingly, the BLM planner must make inquiries to appropriate local, county and state officials about the previous levels of SAR incidents in the local area. If these officials indicate that SAR activities are frequently required in this area and if annual expenditures for SAR operations appear relatively small, the planner might make the initial determination that the local SAR operation does not possess adequate overall capability. Unlike other infrastructure categories, it is difficult to estimate future demand for SAR operations. If a BLM action is expected to increase local population and/or increase local recreational activities, a greater demand for SAR services would thereby be created. Accordingly, this change in demand might require increased local expenditures for SAR operations.

Traditionally, BLM has had a limited direct involvement in SAR operations. County sheriff offices typically hold primary legal responsibility for SAR in a local area, and their jurisdiction will include both private and public lands. BLM might provide some staff or financial assistance in these activities, but usually does not play an important role in SAR operations. BLM, however, recently issued a draft position paper on its SAR policy, and is in the process of developing a revised SAR program. The paper proposed that BLM take a more direct and active role in SAR operations. If these recommendations are implemented, BLM could become increasingly involved in local SAR activities.

II. Assumptions

Several key factors should be considered in an assessment of local SAR operations. As previously indicated, the legal responsibility for SAR traditionally lies with the county government, especially the sheriff's department. In the case of federal and state jurisdictions in parks and forests, the county government may still assume organization leadership, since it usually has greater staff and resources. The sheriff's department might be assisted in these operations by a variety of organizations: the State Police, the U.S. Air Force, Coast Guard, Forest Service, the Federal Aviation Administration, the Federal Communication Commission, church groups, private schools, and other volunteer groups. However, the ultimate responsibility for SAR lies with the agency (in this case the sheriff's department) with primary local jurisdiction. The BLM planner would work directly with the sheriff's department in any matters pertaining to SAR.

Secondly, SAR operation could cover an entire jurisdiction of the sheriff's department. Therefore, each subcategory and element under SAR must be assessed and reviewed for the entire county or region under consideration by BLM. Since topographical maps provide an excellent source of information about the physical characteristics of an area, no additional mapping requirements are necessary for this analysis.

Finally, data on SAR activities typically are not collected and published by county and state agencies. However, information may be available from the files and records of these agencies. Therefore, the BLM planner will have to establish direct contracts with appropriate agency representatives to obtain the necessary information. Also, since it is difficult to estimate peak demand for SAR, data should be collected on an annual basis.

III. Standards

No formal published standards or guidelines are available for assessing the performance of an SAR operation. As previously indicated, the time/distance response factor can be utilized as a means to determine performance capability. However, county and state agencies normally do

not collect the necessary information to determine this factor. If a BLM planner has specific questions on SAR operations, an excellent source of information is the National Association for Search and Rescue (NASAR), La Jolla, California. Although NASAR does not have any official standards on SAR operations, it can provide detailed information on the numerous factors affecting SAR.

SEARCH AND RESCUE (SAR)

Geographic Area: County.

* indicates the necessity to locate on a map.

Source Number	INPUT	PROCESS	OUTPUT
1	Number SAR organizations	→	Number SAR organizations
1	Number of SAR professional staff	→	Number of SAR professional staff
1	Number of SAR volunteer staff	→	Number of SAR volunteer staff
1	Number of SAR transportation vehicles	→	Number of SAR transportation vehicles
1	Annual operating expenditures for SAR operations	→	Annual operating expenditures for SAR operations
1	Types of SAR communications systems	* →	Types of SAR communications systems
1	Annual operating expenditure for SAR communication systems	→	Annual operating expenditure for SAR communication systems
1	Time/distance response factor of SAR operation	→	Time/distance response factor of SAR operation

SEARCH AND RESCUE (SAR)

Sources

1. Primary contact with the county sheriff's department, state police, park police, and other organizations involved in SAR activities.

XII. SOCIAL SERVICES

CATEGORY: SOCIAL SERVICES

Social services are activities designed to promote the social welfare of individuals or groups and involve services concerned with the treatment and aid to the economically and socially underprivileged.

Subcategory: Counseling Services

Counseling services are professional guidance activities utilizing psychological methods and techniques geared toward those experiencing difficulty in dealing with an existing social environment.

- family counseling	(number of employees)
- mental health	(number of employees)
- alcohol and drug abuse	(number of employees)
- child abuse and neglect	(number of employees)
- operating budget	(dollars per year)

Subcategory: Day Care Services

Day care services involve the provision of facilities and supervision for preschool children during the day.

- facilities	(number of children)
- personnel	(number of employees)
- operating budget	(dollars per year)

CATEGORY: SOCIAL SERVICES

Subcategory: Counseling

1. How many mental health facilities are there?
2. How many alcohol/drug abuse facilities are there?
3. How many mental health professionals currently exist?
4. How many alcohol/drug abuse counselors currently exist?
5. What is the availability of mental health and alcoholism/drug abuse services? If clinics are only open during working hours, can an emergency telephone contact be made?
6. What is the maximum case load per day a professional can handle?
7. What is the current demand for counseling services?
8. What are the social and economic indicators in determining the demand for social services? How does this area compare to the state with respect to those indicators?
9. Will the new population be different in terms of social and economic indicators and create an increase in for social services?

Subcategory: Day Care

1. How many day care centers are there and what is their capacity?
2. How many day care homes are there and what is their capacity?
3. What are the occupancy rates of day care centers and homes?
4. Are there waiting lists for day care?
5. How do local day care center staff/child ratios compare with state and federal requirements?
6. How do local day care home staff/child ratios compare with state and federal requirements?

SOCIAL SERVICES

I. General Approach

Two major categories of social services are expected to be affected by BLM activities in rural areas: counseling and day care services. The demand for these services can increase as a result of a rise in the socioeconomic status of an existing population or of an influx of new population. The demand for counseling services, in particular, may increase if the new population is significantly different from the existing population in its social or economic status.

No federal guidelines exist for the provision of counseling services in the U.S. Priorities and planning for counseling services occur primarily at the catchment level within each state. Catchment areas in rural regions consist of one or more counties. Elements on the IPO must be aggregated to reflect the sum of all counties in the catchment area.

Neither the capacity of existing counseling centers nor the demand for counseling services can be quantified. Demand for counseling services in particular is difficult to quantify. The demand of the existing population for counseling is reflected in the current case load of counseling centers as well as in police, school, and hospital records. Social and economic data on the existing population in comparison with the state or nation may also indicate a potential demand for counseling services. If these indicators reflect a large potential demand, the BLM analyst can assume that a problem already exists with respect to the provision of counseling services in the area. Any influx of population as a result of a BLM action will only create further problems.

The IPO for counseling provides a framework for utilizing selected social and economic indicators to help the planner identify "high risk" populations in terms of need for counseling services. These indicators do not, however, reflect local attitudes toward counseling services or the degree of utilization of counseling services by the "high risk" population. In determining the impact a BLM action will have on a local counseling program it will be necessary for the analyst to determine whether there are significant social and economic variations between the existing population and the incoming population. If so, an increase in demand for counseling services can be anticipated.

Data on the availability of counselors and the maximum case load per counselor generally describe not only the "capacity" of counseling services but also the utilization of such services. As in the economics of the health care field, the addition of supply in numbers of counseling professionals results in additional demand. That is, the availability of new services results in larger numbers of people utilizing those services.

Day care services are generally provided in two types of facilities: homes and centers. BLM activities which result in an influx of families, especially single-parent families or those with two working parents, and small children under the age of five will be most likely to have an impact on the local provision of day care services. The IPO for day care will provide a framework for determining whether the local day care system is capable of accommodating additional children. The lack of sufficient day care facilities may present a problem for the two-parent family by preventing one of the parents from working.

II. Assumptions

Social services encompass a broad range of activities from programs geared specifically to the aged or handicapped to programs providing public financial assistance. It is expected, however, that the BLM activities in rural areas will primarily affect counseling and day care services. It is assumed that in most cases public assistance programs (e.g., food stamps and medicare) will not be affected by a BLM action if that action generates new employment. Further, there are virtually no monetary constraints on public agenices in providing public assistance that BLM would need to consider in determining the capabilities of local infrastructures to handle an influx of population.

Day care services, although licensed and funded through the state and federal governments, are normally operated by private groups. An influx of population generating an increased demand for day care services will be accommodated locally either by existing day care facilities or by the creation of new facilities within the private market. The elements of the IPO for day care are measured on the county level. It may, however, be desirable to map the location of the day care facilities within the county, particularly in areas where a county covers a large geographical area and travel distances to day care facilities must be considered.

The geographic area utilized in planning for counseling services is the catchment area. The National Institute of Mental Health has compiled a demographic data base, known as the MHPDs, for all catchment areas in the U.S. It is based on the 1970 census and will provide the most useful source for identifying "high risk" populations in terms of the demand for counseling services.

Catchment areas in rural regions generally encompass one or more counties. Thus, while many of the items on the IPO may be available on a county basis, they then must be aggregated to show data for a complete catchment area.

III. Standards

The BLM analyst will find it useful to compare local social and economic indicators with state indicators to determine the potential local demand for counseling services. Comparisons with other areas experiencing rapid growth may also be useful.

Day care services are very strictly regulated by most states and the federal government. Thus, although the analyst may determine that day care centers are operating at less than capacity, state regulations may prohibit the admission of new children without a corresponding increase in day care staff. Regulations may vary by state with respect to staff/child ratios for day care centers and day care homes as well as staff/child requirements by the age of the child.

SOCIAL SERVICES: Counseling

Geographic Area: For all inputs except those from MHPDs (see source 5), the geographic area is the county. For those sourced by footnote #5, the geographic area is the catchment area (one or more counties).

Source Number	INPUT	PROCESS	OUTPUT
3	No. of mental health clinics	→	No. of mental health clinics
4	No. of alcoholism/drug abuse clinics	→	No. of alcoholism/drug abuse clinics
3	No. of mental health professionals	→	No. of mental health professionals
4	No. of alcoholism/drug abuse professionals	→	No. of alcoholism/drug abuse professionals
1	No. of hours per day mental health facilities are open	→	No. of hours per day mental health facilities are open
1	No. of hours per day alcoholism/drug abuse facilities are open	→	No. of hours per day alcoholism/drug abuse facilities are open
1	No. of hours per day telephone contacts can be made by mental health clients	→	No. of hours per day telephone contacts can be made by mental health clients
1	No. of hours per day telephone contacts can be made by alcoholism/drug abuse clients	→	No. of hours per day telephone contacts can be made by alcoholism/drug abuse clients
1	Average case load per day per professional	→	Average case load per day per professional
0 5	No. of mental health professionals Total population	Mental health professional ÷ total population ÷ 1000	No. of mental health professionals per 1000 population
0 5	Alcoholism/drug abuse professionals Total population	Alcoholism/drug abuse professionals ÷ total population ÷ 1000	Alcoholism/drug abuse professionals per 1000 total population

Geographic Area: For all inputs except those from MHPDs (see source 5), the geographic area is the county. For those sourced by footnote #5, the geographic area is the catchment area (one or more counties).

Source Number	INPUT	PROCESS	OUTPUT
	(Current demand for alcoholism/drug abuse professionals)		
1	Current no. of alcoholism/drug abuse clients	→	Current no. of alcoholism/drug abuse clients
0	Percent of population above 65 years of age	→	Percent of population above 65 years of age

Geographic Area: For all inputs except those from MHPDs (see source 5), the geographic area is the county. For those sourced by footnote #5, the geographic area is the catchment area (one or more counties).

Source Number	INPUT	PROCESS	OUTPUT
2	Average no. of arrests per month for drunken driving	→	Average no. of arrests per month for drunken driving
6	Numbers enrolled in Alcoholics Anonymous	→	Number enrolled in Alcoholics Anonymous
7	Average no. of monthly hospital admissions for alcoholism and drug abuse	→	Average no. of monthly hospital admissions for alcoholism and drug abuse
8	No. of reported cases of persons with alcoholism/drug abuse problems	→	No. of reported cases of persons with alcoholism/drug abuse problems
	(Current demand for child abuse counseling professionals)		
1	Current case load of child abuse counselors	→	Current case load of child abuse counselors
2	Police records on average number of cases of child abuse and neglect per month	→	Police records on average number of cases of child abuse and neglect per month
9	School records on average number of cases of child abuse and neglect per month	→	School records on average number of cases of child abuse and neglect per month
7	Hospital records on admissions of cases of child abuse and neglect per month	→	Hospital records on admissions of cases of child abuse and neglect per month
	(Current demand for mental health professionals)		
1	Current case load at mental health clinics	→	Current case load at mental health clinics

SOCIAL SERVICES: Counseling (Cont.)

Geographic Area: For all inputs except those from MHPDs (see source 5), the geographic area is the county. For those sourced by footnote #5, the geographic area is the catchment area (one or more counties).

Source Number	INPUT	PROCESS	OUTPUT
7	Average number of hospital admissions for psychiatric beds per month	→	Average number of hospital admissions for psychiatric beds per month
9	School records on average no. of children requiring counseling per month	→	School records on average no. of children requiring counseling per month
	(Socioeconomic status of current population)		
5	Current unemployment rate	→	Current unemployment rate
5	Percent of population with incomes below the poverty level	→	Percent of population with incomes below the poverty level
10	Percent of total population receiving public assistance	→	Percent of total population receiving pulbic assistance
	Racial breakdowns by % of total population:		
5	% White	→	% White
5	% Black	→	% Black
11	% Spanish-surname	→	% Spanish-surname
11	% Indian	→	% Indian
11	% Other	→	% Other
5	Percent of population with incomes below the poverty level - State	→	Percent of population with incomes below the poverty level - State

SOCIAL SERVICES: Counseling (Cont.)

Geographic Area: For all inputs except those from MHPDs (see source 5), the geographic area is the county. For those sourced by footnote #5, the geographic area is the catchment area (one or more counties).

Source Number	INPUT	PROCESS	OUTPUT
5	Current unemployment rate (State)	→	Current unemployment rate (State)
11	Percent of total population receiving public assistance (State)	→	Percent of total population receiving public assistance (State)
5	Percent of families with female head with children under 18 years below poverty level	→	Percent of families with female head with children under 18 years below poverty level
5	State percent of families with female head with children under 18 years below poverty level	→	State percent of families with female head with children under 18 years below poverty level
5	Percent of families below poverty level with related children under 18	→	Percent of families below poverty level with related children under 18
5	State percent of families below poverty level with related children under 18	→	State percent of families below poverty level with related children under 18
5	Percent of males aged 14 and over who are single	→	Percent of males aged 14 and over who are single
5	Percent of females aged 14 and over who are single	→	Percent of females aged 14 and over who are single
5	Percent of males aged 14 and over who are married and separated	→	Percent of males aged 14 and over who are married and separated
5	Percent of females aged 14 and over who are married and separated	→	Percent of females aged 14 and over who are married and separated
5	State - Percent of males aged 14 and over who are single	→	State - Percent of males aged 14 and over who are single

Geographic Area: For all inputs except those from MHPDs (see source 5), the geographic area is the county. For those sourced by footnote #5, the geographic area is the catchment area (one or more counties).

Source Number	INPUT	PROCESS	OUTPUT
5	State - Percent of females aged 14 and over who are single	→	State - Percent of females aged 14 and over who are single
5	State - Percent of males aged 14 and over who are married and separated	→	State - Percent of males aged 14 and over who are married and separated
5	State - Percent of females aged 14 and over who are married and separated	→	State - Percent of females aged 14 and over who are married and separated
5	Low occupational status-percent of employed males aged 16 and over who are operatives, service workers, and laborers, including farm laborers	→	Low occupational status-percent of employed males aged 16 and over who are operatives, service workers, and laborers, including farm laborers
5	High occupational status-percent of employed males aged 16 and over who are professionals, technical and kindred workers, and managers except farm	→	High occupational status-percent of employed males aged 16 and over who are professionals, technical and kindred workers, and managers except farm
5	State - Low occupational status - percent of employed males ages 16 and over who are operatives, service workers, and laborers, including farm laborers	→	State - Low occupational status - percent of employed males ages 16 and over who are operatives, service workers, and laborers, including farm laborers
5	State - High occupational status - percent of employed males aged 16 and over who are professionals, technical and kindred workers, and managers except farm	→	State - High occupational status - percent of employed males aged 16 and over who are professionals, technical and kindred workers, and managers except farm

SOCIAL SERVICES: Counseling (Cont.)

Geographic Area: For all inputs except theose from MHPDs (see source 5), the geographic area is the county. For those sourced by footnote #5, the geographic area is the catchment area (one or more counties).

Source Number	INPUT	PROCESS	OUTPUT
5	Low occupational status - percent of employed females aged 16 and over who are operatives, service workers, and laborers, including farm laborers	→	Low occupational status - percent of employed females aged 16 and over who are operatives, service workers, and laborers, including farm laborers
5	State - Low occupational status - percent of employed females aged 16 and over who are operatives, service workers and laborers, including farm laborers	→	State - Low occupational status - percent of employed females aged 16 and over who are operatives, service workers and laborers, including farm laborers
5	High occupational status - percent of employed females aged 16 and over who are professionals, technical and kindred workers, and managers except farm	→	High occupational status - percent of employed females aged 16 and over who are professionals, technical and kindred workers, and managers except farm
5	State - High occupational status - percent of employed females aged 16 and over who are professionals, technical and kindred workers, and managers except farm	→	State - High occupational status - percent of employed females aged 16 and over who are professionals, technical and kindred workers, and managers except farm
5	Median income of families and unrelated individuals	→	Median income of families and unrelated individuals
5	State median income of families and unrelated individuals	→	State median income of families and unrelated individuals
11	Number of males	→	Number of males
11	Number of females	→	Number of females
0	No. of males	No. of males ÷ no. of females	Current male-female ratio
0	No. of females		

Geographic Area: For all inputs except those from MHPDs (see source 5), the geographic area is the county. For those sourced by footnote #5, the geographic area is the catchment area (one or more counties).

Source Number	INPUT	PROCESS	OUTPUT
0 0 0 0	No. of males No. of new males No. of females No. of new females	(No. of males + no. of new males) ÷ (no. of females + no. of new females)	Male-female of total population (existing plus new population)
0 0	No. of new females No. of new males	No. of new males ÷ no. of new females	Male-female ratio of new population
0	Number of new males	→	No. of new males
0	Number of new females	→	No. of new females
0	Median income of families and unrelated individuals - new population	→	Median income of families and unrelated individuals - new population
0	New population - percent of males aged 14 and over who are single	→	New population - percent of males aged 14 and over who are single
0	New population - percent of females aged 14 and over who are single	→	New population - percent of females aged 14 and over who are single
0	New population - percent of persons not living in households	→	New population - percent of persons not living in households
	(Racial breakdown of new population)		
0	% White (new population)	→	% White (new population)
0	% Black (new population)	→	% Black (new population)
0	% Spanish-surname (new population)	→	% Spanish-surname (new population)
0	% Indian (new population)	→	% Indian (new population)
0	% Other (new population)	→	% Other (new population)

SOCIAL SERVICES: Counseling

Sources

1. Field Survey.

2. Police records.

3. State Mental Health Agency.

4. State Alcoholism/Drug Abuse Agency.

5. DHEW, National Institute of Mental Health, Division of Biometry, Mental Health, Demographic Profile System (MHPDS). The MHPDS contains data on all catchment areas in the U.S. Most state mental health agencies have copies of these data. For those states not having copies of MHPDS, contact DHEW, National Institute of Mental Health, Division of Biometry (Room 18-C-18, 5600 Fishers Lane, Rockville, Maryland 20852).

6. Local Alcoholics Anonymous Agency.

7. Local hospital records.

8. Local industrial records.

9. Local school records.

10. Local welfare and public assistance agencies.

11. U.S. Department of Commerce, Bureau of the Census, Census of Population (Decennial) and Current Population Estimates, Series P-25 and P-26. (updated annually).

0. System output.

SOCIAL SERVICES: Day Care

Geographic Area: County

* indicates the necessity to locate on a map.

Source Number	INPUT	PROCESS	OUTPUT
1	Number of day care centers	* →	Number of day care centers
1	Number of day care homes	* →	Number of day care homes
1	Capacity of day care centers (number of children)	→	Capacity of day care centers (number of children)
1	Capacity of day care homes (number of children)	→	Capacity of day care homes (number of children)
1	Number of day care center staff	→	Number of day care center staff
1	Number of day care home staff	→	Number of day care home staff
2	Number of children under age 2 attending day care centers	→	Number of children under age 2 attending day care centers
2	Number of children under age 2 attending day care homes	→	Number of children under age 2 attending day care homes
2	Number of children over age 2 attending day care centers	→	Number of children over age 2 attending day care centers
2	Number of children over age 2 attending day care homes	→	Number of children over age 2 attending day care homes
2	Total number of children attending day care centers	→	Total number of children attending day care centers
2	Total number of children attending day care homes	→	Total number of children attending day care homes

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
0	Capacity of day care centers	Number of children ÷ capacity of centers	Percent occupancy of day care centers
0	Capacity of day care homes	Number of children ÷ capacity of homes	Percent occupancy of day care homes
2	Number of children on waiting list for day care centers and homes	→	Number of children on waiting list for day care centers and homes
0 0	Number of day care center staff Number of day care center children	Number of staff ÷ number of children	Day care center staff/child ratio
0 0	Number of day care home staff Number of day care home children	Number of staff ÷ number of children	Day care home staff/child ratio
0 0	Number of day care center staff Number of day care center children under age 2	Number of staff ÷ number of children under age 2	Day care center staff/child under age 2 ratio
0	Number of day care center staff Number of day care center children over age 2	Number of staff ÷ number of children over age 2	Day care center staff/child over age 2 ratio
0 0	Number of day care home staff Number of day care home children under age 2	Number of staff ÷ number of children under age 2	Day care home staff/child under age 2 ratio
0 0	Number of day care home staff Number of day care home children over age 2	Number of home staff ÷ number of children over age 2	Day care home staff/child over age 2 ratio

SOCIAL SERVICES: Day Care (Cont.)

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
3	State standard for day care center staff/child ratio	→	State standard for day care center staff/child ratio
3	State standard for day care center staff/child under age 2 ratio	→	State standard for day care center staff/child under age 2 ratio
3	State standard for day care center staff/child over age 2 ratio	→	State standard for day care center staff/child over age 2 ratio
3	State standard for day care home staff/child ratio	→	State standard for day care home staff/child ratio
3	State standard for day care home staff/child under age 2 ratio	→	State standard for day care home staff/child under age 2 ratio
3	State standard for day care home staff/child over age 2 ratio	→	State standard for day care home staff/child over age 2 ratio
4	Federal standards for day care center staff/child by age ratio	→	Federal standards for day care center staff/child by age ratio
4	Federal standards for day care home staff/child by age ratio	→	Federal standards for day care home staff/child by age ratio

SOCIAL SERVICES: Day Care

Sources

1. Day care centers and homes are licensed by the state. Data is usually available from the State Department of Health and/or Social Services. If not, County Departments of Health and/or Social Services will maintain these records.

2. County records may or may not include data on the number of children by age. It may be necessary to contact each day care center and home to collect this information. In addition, regulations on staff/child ratios vary by state. If a state has no requirements for ratios by age, it will not be necessary to collect this information except for purposes of comparison of local ratios with federal requirements. If comparison with federal requirements is not desired, only data on total numbers of children need to be collected.

3. State Department of Health and/or Social Services.

4. Department of Health, Education, and Welfare, Federal Interagency Day Care Requirements, DHEW #OHD-76-31081, September, 1968. (May be updated in 1978.)

0. System output.

XIII. SOLID WASTE

CATEGORY: SOLID WASTE

Useless, unwanted, or discarded material that is not wet enough to be free-flowing.

Subcategory: Storage, Collection, and Transportation

Storage is the handling of solid waste at the source of generation; collection concerns the type and frequency of removal; and transportation concerns the transfer of solid waste to the point of disposal.

- cans and bulk containers	(number) (gallons)
- collection vehicles	(number) (tons)
- personnel	(number of employees)
- operating budget	(dollars per year)

Subcategory: Disposal

Systems for the ultimate disposal of solid waste (e.g., landfills, dumps).

- facilities	(tons or tons per day)
- disposal equipment	(number, tons)
- personnel	(number of employees)
- operating budget	(dollars per year)

CATEGORY: SOLID WASTE

Subcategory: Storage, Collection, and Transportation

Disposal

1. How many storage facilities exist?
2. What is the current capacity of storage facilities?
3. How many households are there?
4. How many commercial enterprises and institutions are there?
5. What is the average rate of household waste generation? Farm or Ranch
6. What is the average rate of commercial enterprise generation?
7. What is the average rate of institutional generation?
8. What is the average total daily or weekly rate of generation of solid waste?
9. What is the frequency of collection from the storage facilities?
10. What is the total time required to collect and transport solid waste to the point of disposal?
11. Are there enough collection vehicles to meet new demand?
12. Are there sufficient operators and crew for the collection and transportation of solid waste?
13. How full are the collection vehicles when they arrive at the disposal point?
14. What are the annual operating expenditures of the system?
15. What capital expenditures, if any, are there?
16. What is the annual debt service or bond issue?
17. What is the schedule of payments for debt service?

Subcategory: Disposal

1. What is the current capacity of disposal facilities?
2. What is the current rate at which capacity is being diminished?
3. Is there sufficient disposal equipment to meet demand?
4. Are there enough operators for the disposal equipment?
5. What are the annual operating expenditures of the system?

CATEGORY: SOLID WASTE

Subcategory: Disposal (cont.)

6. What capital expenditures, if any, are there?

7. What is the annual debt service or bond issues?

8. What is the schedule of payments for debt service?

SOLID WASTE

I. General Approach

Solid waste disposal practices in rural areas range from open dumping to regulated sanitary landfilling. However, as a result of the Resource Conservation and Recovery Act of 1976 states are being required to close and/or upgrade existing open dumps to sanitary landfills by October, 1983. This Act also prohibited the creation of new open dumps. Because of the growing trends toward the regulation of rural solid waste disposal practices and the conversion from dumping to sanitary landfills, the general approach used in this analysis does not include dumps or unregulated facilities which may be health or pollution hazards. Only sanitary landfills will be included in the IPO.

The approach used in this analysis also excludes industrial and agricultural wastes. Public and private solid waste collection and disposal systems in rural areas generally do not provide for the handling of such wastes. Where collection service is available in rural areas, house-to-house collection is the practice most frequently used. Thus, the methods of handling toxic or other industrial and agricultural wastes are not included in the IPO.

Any BLM action resulting in an increase in the population of a rural area will have an impact on local solid waste collection and disposal practices. The IPO for solid waste can be used as a tool by the BLM analyst to predict the additional solid waste that will be generated by the new population (and any new supporting institutions or commercial enterprises) and the capabilities of the existing system to handle the additional solid waste. The generation of additional solid waste by an incoming population may create a need for additional disposal facilities. The development of new residential areas may create a need for extended collection series. The BLM analyst can utilize the IPO to assess what new requirements will be placed on an existing solid waste system.

II. Assumptions

Approximately 42 percent of those living in rural areas are responsible for handling their own solid waste. The remaining 58 percent are provided with collection services which are for the most part privately operated. Only about 16 percent of all rural residents are serviced by publicly operated collection systems.[1]

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[1] Theodore L. Goldberg, Improving Rural Solid Waste Management Practices, U.S. Environmental Protection Agency, (#SW-107), 1973, p. 14.

The generation rates of solid waste are provided in the IPO chart in terms of average weekly rates. This approach does not take into account the seasonal variations of solid waste generation which call for increased levels of service (e.g., Christmas, autumn leaf pick-ups). However, the local solid waste collection agency is assumed to be capable of handling these variations given that it can accommodate an existing (and new) service population.

The geographic area of solid waste infrastructures in rural areas for the IPO is the county. Data may have to be obtained from a variety of sources besides the county, such as municipal sanitation departments and local private collection and disposal contractors. A mapping of the location of sanitary landfills in the county may also be desirable, particularly in counties with large geographical areas where the location of landfills can influence the patterns of collection systems.

III. Standards

Federal, state, and local regulations with respect to solid waste systems are concerned primarily with the mitigation of adverse health, safety and pollution factors in the disposal of solid waste. The BLM analyst need not be concerned with these regulations in assessing the impacts of a BLM action, since he or she will be assessing the capabilities of existing facilities which presumably have already met the requirements of such regulations.

The assessment of the impacts of a BLM action on a local solid waste collection and disposal infrastructure will be based primarily on the capabilities of the existing system to handle an increased demand for collection and disposal services.

SOLID WASTE: Storage, Collection, and Transportation

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
1	Number of storage facilities (containers)	→	Number of storage facilities (containers)
1	Capacity of storage facilities	→	Capacity of storage facilities
1	Number of households	→	Number of households
1	Number of commercial enterprises	→	Number of commercial enterprises
1	Number of institutions	→	Number of institutions
1	Average total weekly solid waste generated	→	Average total weekly solid waste generated
1	Percent of average total weekly solid waste generated attributable to households	→	Percent of average total weekly solid waste generated attributable to households
1	Percent of average total weekly solid waste generated attributable to commercial enterprises	→	Percent of average total weekly solid waste generated attributable to commercial enterprises
1	Percent of average total weekly solid waste generated attributable to institutions	→	Percent of average total weekly solid waste generated attributable to institutions
0	Average total weekly solid waste generated	Average total weekly solid waste x percent attributable to households	Total weekly household solid waste generated
0	Percent of average total weekly solid waste generated attributable to households		

SOLID WASTE: Storage, Collection, and Transportation (Cont.)

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
0 0	Average total weekly solid waste generated Percent of average total weekly solid waste generated attributable to commercial enterprises	Average total weekly solid waste x percent attributable to commercial enterprises	Total weekly commercial solid waste solid waste generated
0 0	Average total weekly solid waste generated Percent of average total weekly solid waste generated attributable to institutions	Average total weekly solid waste x percent attributable to institutions	Total weekly institutional solid waste generated
0 0	Number of households Total weekly household waste generated	Total number of households weekly solid waste generated	Average rate of weekly household waste generation
0 0	Number of commercial enterprises Total weekly commercial waste generated	Total weekly solid waste generated ÷ number of commercial enterprises	Average rate of weekly commercial waste generation
0 0	Number of institutions Total institutional waste generated weekly	Total number of institutions ÷ weekly waste generated	Average rate of weekly institutional waste generation
0 0	Number of households Average rate of household waste generated	Number of households x average rate of household waste generated	Total household waste generated
2 0	Number of commerical enterprises Average rate of commercial waste generated	Number of commercial enterprises x average rate of commercial waste generated	Total commercial waste generated

SOLID WASTE: Storage, Collection, and Transportation (Cont.)

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
2 0	Number of new institutions Average rate of institutional waste generated	Number of institutions x average rate of institutional waste generated	Total new institutional waste generated
0 0 0	Total household waste generated Total commercial waste generated Total institutional waste generated	Total household waste + total commercial waste + total institutional waste	Total solid waste generated
1	Frequency of collection from storage facilities	→	Collection rate
1 1 0	Speed limit Length of total route No. of storage containers Average container collection time (minutes)	(Speed limit x length of total route) + (No. of storage containers) x (average container collection time)	Total time of collection
1 1	No. of collection vehicles Total capacity of collection vehicles	→	No. of collection vehicles Total capacity of collection vehicles
0 0	Total solid waste generated Total capacity of collection vehicles	Total solid waste generated ÷ capacity of collection vehicles	Utilization of collection vehicle capacity
1	No. of collection vehicle operators	→	No. of collection vehicle operators
1	No. of collection crew members	→	No. of collection crew members
0 0	No. of collection vehicles No. of collection vehicle operators	No. of vehicle operators ÷ no. of vehicles	Operators per vehicle

SOLID WASTE: Storage, Collection, and Transportation (Cont.)

Geographic Area: County

Source Number	INPUT	PROCESS	OUTPUT
0 0	No. of collection crew members No. of collection vehicles	No. of crew members ÷ no. of vehicles	Crew members per vehicle
3	Annual operating expenditures	→	Annual operating expenditures
3	Annual capital expenditures	→	Annual capital expenditures
3	Annual debt service on land issues	→	Annual debt service on land issues

SOLID WASTE: Disposal

Geographic Area: County

* indicates the necessity to locate on a map.

Source Number	INPUT	PROCESS	OUTPUT
1	Number of disposal facilities (landfills)	* →	No. of disposal facilities (landfills)
1	Capacity of disposal facilities (landfills)	→	Capacity of disposal facilities (landfills)
0	Total solid waste generated week	Total solid waste ÷ capacity of disposal facilities	Weekly rate of utilization of disposal facilities
1	Disposal vehicles (number)	→	No. of disposal vehicles
1	Capacity of disposal vehicles	→	Capacity of disposal vehicles
1	No. of disposal operators	→	No. of disposal operators
0	No. of disposal operators	No. of operators ÷ no. of vehicles	Operators per vehicle
0	No. of disposal vehicles		
3	Annual operating expenditures	→	Annual operating expenditures
3	Annual captial expenditures	→	Annual capital expenditures
3	Annual debt service on land issues	→	Annual debt service on land issues

SOLID WASTE: Storage, Collection, Transportation, Disposal

Sources

1. Local contacts with municipal and county sanitation departments (may be part of public works departments, or departments of environmental services) should provide data on publicly operated systems. Privately operated system data will be obtaining through field surveys of private collectors and landfill operators (see yellow pages of local telephone directory).

2. Field survey.

3. Local budget.

O. System output.

XIV. STORM-WATER RUNOFF

CATEGORY: STORM-WATER RUNOFF

Systems which are intended to prevent excessive levels of water from collecting within (or entering) the community during storms.

Subcategory: Primary Collection

Drains, gutters and other devices which collect storm-water from areas with low ground permeability and convey it into a transmission/disposal network.

- drains and gutters	(acres served) (gallons per minute collection rate)
- operating budget	(dollars per year)

Subcategory: Transmission and Disposal

Systems (e.g., culverts or channels) which convey collected runoff water within the community to catchment areas, reservoirs, rivers or other disposal points. Flood control reservoirs are included in the subcategory External Flood Protection.

- transmission network	(gallons per minute transmission rate)
- operating budget	(dollars per year)

Subcategory: External Flood Protection

Systems (e.g., dikes, dams, etc.) which protect communities from innundation from external sources of storm-water runoff such as rivers.

- water storage	(number of dams and reservoirs)
- dikes	(acres protected)
- operating budget	(dollars per year)

CATEGORY: STORM-WATER RUNOFF

Subcategories: Primary Collection, Transmission and Disposal, External Flood Protection

1. Are primary collectors adequate to prevent localized flooding during major storms?
2. Do rivers near the community have the potential to flood portions of the community during major storms?
3. What proportion of the community is served by a storm-water runoff collection system?
4. Is the capacity of the existing system adequate?
5. Are there dams or reservoirs which protect the community from river flooding?
6. Are there dikes which protect the community from river flooding?
7. How much of the community is protected by these dikes?
8. Will new development increase storm-water runoff by reducing ground permeability?
9. What level of river flow, runoff rate, etc., are associated with the standard project storm?
10. What are the annual operating expenditures of the system?
11. What capital expenditures, if any, are there?
12. What is the annual debt service on bond issues?
13. What is the schedule of payments for debt service?

STORM-WATER RUNOFF

I. General Approach

Rain storms can cause flooding when the rate of rainfall exceeds the soil's ability to absorb it or when rain causes nearby rivers to rise significantly. Primary storm-water collection systems and transmission and disposal systems remove water that falls within the community. External flood protection systems (e.g., dikes or dams) protect the community from rain-swollen rivers.

Primary collection systems are placed in areas where water tends to collect during storms. Soil permeability, groundcover, soil slope and other local factors determine the location and extent of such areas. Collection systems are most frequently connected with paved roads, since road surfaces have almost no permeability.

Transmission and disposal systems transfer collected water from the flood-prone areas to disposal areas. In most communities these systems are independent of the wastewater collection system.

Protection from external flood sources can be achieved either through dams or dikes. Dams hold back rain water and allow it to flow out gradually, to avoid flooding. Dikes surround low-lying portions of a community and prevent flooding when river levels rise.

Larger communities invariably have extensive storm-water runoff systems. Smaller communities may not need such systems if land development occurs at fairly low population density and does not significantly alter ground permeability.

There are several ways in which BLM actions may affect a community's storm-water runoff system. If the BLM action results in widespread changes in land use over large areas, runoff patterns in rivers may be altered, increasing the possibility of serious flooding. Few if any BLM actions, however, will have such significant impacts. Impacts on the storm-water runoff system are more likely to occur when BLM actions affect development within a community. Population increases brought about by BLM actions may increase the number of houses and the number of roads within the community, decreasing soil permeability and placing additional demands on the storm-water runoff system.

The key variables describing a storm-water runoff system are presented in the input column of the IPO chart. Demand variables measure the expected amount of runoff. Capacity variables measure the amount of runoff that the system is capable of handling. The remaining variables in the input column describe relevant community characteristics and the standards by which adequacy can be measured. The process column presents a method for

relating changes in the key variables to changes in the degree of protection afforded by the storm-water runoff system.

Demand for storm-water collection, transmission and disposal services is measured in terms of a maximum expected runoff rate. This rate is based on the maximum-sized storm expected[1] and local geological conditions. Demand for external flood protection services is measured in terms of the area within the community subject to flooding.

The capacity of the storm-water collection, transmission and disposal systems must be sufficient to handle the maximum expected runoff rate. The land area served by the system provides an indication of the importance of the role played by storm-water runoff protection in the community, but does not measure capacity since storm-water collection will be necessary only in some areas of a community. The adequacy of external flood protection systems can be measured by the fraction of the community which is not protected from floods. This can be determined from elevation maps of the community and estimates of river levels after storms.

II. Assumptions

The geographical area relevant to data collection is the local jurisdiction, since it is local jurisdictions which build and maintain storm-water runoff systems. A major exception to this is the system of flood control reservoirs and dams built (primarily) by the federal government along major rivers. Although the influence of these systems should be considered, they are not included in the infrastructure since BLM actions are unlikely to affect them.

Flooding due to accumulation of storm-water within a community will be a localized phenomenon. Even if the overall capacity of the primary collection system is greater than the maximum expected runoff rate, localized flooding problems may still occur. This is a generic problem associated with the IPO structure -- to gather data for every single collection area would require an unreasonable amount of effort. Accordingly, the capacity and runoff rate data should be regarded as providing a general understanding of the needs of a community rather than as a blueprint for specifically determining how community flooding problems can be solved.

III. Standards

Large variations in storm-water runoff needs from community to community make national or state standards and examples (e.g., storm-water collectors per capita) meaningless for measuring system adequacy. The accepted rule of thumb is that all community structures should be protected from flooding to the fullest extent practicable. In applying this rule of thumb,

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[1] This is sometimes referred to as a standard project storm. Frequently a 100-year storm is used to set an upper bound on the amount of runoff expected.

several useful measures can be developed which pinpoint the adequacy of the community storm-water runoff system. The most useful measure is the percent of system capacity utilized. The presumed standard is 100 percent utilization. The fraction of a community's area protected by a storm-water runoff system provides an index of the severity of flood control problems. Finally, the percentage of the community's area subject to flooding provides a clear measure of the inadequacies in the storm-water runoff system. The presumed standard is, of course, that no areas should be left unprotected.

STORM-WATER RUNOFF: Primary Collection

Geographic Area: County or municipality.
* Indicates the necessity to locate on a map.

Source Number	INPUT	PROCESS	OUTPUT
1	Area served	* →	Area served
1	Design collector flow rate	→	Design collector flow rate
1	Maximum expected runoff rate	→	Maximum expected runoff rate
2	Operating budget	→	Operating Budget
0 0	Design collector flow rates Maximum expected runoff rates	Maximum expected runoff rates ÷ design collector flow rates	Fraction of collector system capacity utilized
0 0	Area served Land area in community	Area served ÷ land area in community	Fraction of the community served by a collector system

STORM-WATER RUNOFF: Primary Collection

Sources

1. Primary contact with a representative of the local agency responsible for flood control.

2. Primary contact with the community's town clerk or other official.

0. System output.

STORM-WATER RUNOFF: Transmission and Disposal

Geographic Area: County or municipality

Source Number	INPUT	PROCESS	OUTPUT
1	Design transmission flow rate	→	Design transmission flow rate
2	Operating budget	→	Operating budget
0 0	Design transmission flow rate Maximum expected runoff rate	Maximum expected runoff rate ÷ design transmission flow rates	Fraction of storm water runoff transmission system capacity utilized

STORM-WATER RUNOFF: Transmission and Disposal

Sources

1. Primary contact with a representative of the local agency responsible for flood control.

2. Primary contact with the community's town clerk or other official.

0. System output.

STORM-WATER RUNOFF: External Flood Protection

Geographic Area: County or municipality
* Indicates the necessity to locate on a map.

Source Number	INPUT	PROCESS	OUTPUT
1,2	Number of flood control reservoirs	$\xrightarrow{*}$	Number of flood control reservoirs
2	Area protected by flood control dikes	$\xrightarrow{*}$	Area protected by flood control dikes
2,4	Developed area subject to flooding	$\xrightarrow{*}$	Developed area subject to flooding
3	Operating budget	$\xrightarrow{*}$	Operating budget
0	Area protected by flood control dikes Land area in community	Area protected by flood control dikes ÷ land area in community	Fraction of the community served by the flood control dikes
0 0	Developed area subject to flooding Land area in community	Developed area subject to flooding ÷ land area in community	Fraction of the community subject to flooding

STORM-WATER RUNOFF: External Flood Protection

Sources

1. Army Corps of Engineers, National Program of Inspection of Dams, (five volumes), 1974. (Contains data on larger dams and reservoirs.)

2. Primary contact with a representaive of the local agency responsible for flood control.

3. Primary contact with the community's town clerk or other official.

4. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Plain Management Division, 202-426-1981. (100-year flood plain maps are available.)

0. System output.

XV. TRANSPORTATION

CATEGORY: TRANSPORTATION

Systems for conveying people from one location to another within the region. Included are vehicles and support facilities (roads, traffic signals, etc.). Private vehicles and services are excluded except where 1) service is provided under contractual arrangement (e.g., community bus lines), or 2) market entry for providing services is limited (e.g., taxi cabs).

Subcategory: Mass Transit

Local transportation vehicles (except for private cars), such as buses and taxis; and regional transit systems, such as passenger trains.

- buses	(number of buses)
	(number of persons)
	(houses served by routes)
- bus operators	(number of persons)
- taxi cabs	(number of vehicles)
- passenger railroads	(location of railroad terminals)
- air transit	(location of airports)
- regional bus transit	(location of bus terminals)
- operating budget	(dollars per year)

Subcategory: Car Transit

Included are all support facilities which enhance and make possible transit by car. This would include streets, roads, signals, street lights, snow removal, etc.

- streets and roads	(miles paved)
	(miles unpaved)
	(major transportation routes)
	(peak cars per hour)
- signal lights	(number of lights)
	(number of "key" intersections)
- street lights	(miles of lighting)
- parking	(number of spaces in central business district)
- snow removal equipment	(number of plows)
- road department personnel	(number of employees)
- operating budget	(dollars per year)

Subcategory: Pedestrian Transit

Systems which support all non-motorized methods of locomotion, including bicycling. Facilities will be primarily sidewalks.

- sidewalks	(miles)
- operating budget	(dollars per year)

CATEGORY: TRANSPORTATION

Subcategories: Mass Transit, Car Transit, Pedestrian Transit

1. How many miles of paved road exist in the community? Unpaved road?
2. How many cars can major transportation routes handle during "rush hour" periods?
3. Does road congestion exist?
4. What are the major transportation routes?
5. Will new housing require either new roads or road upgrading?
6. Are the existing signal lights adequate for traffic control?
7. Are traffic signals sequenced to allow optimum traffic flow?
8. Are roads capable of providing quick access for fires and medical emergencies?
9. What is the number of parking spaces per capita in the community's central business district (CBD)?
10. What percentage of the community streets and roads is equipped with street lighting?
11. How many miles of sidewalks are there?
12. What is the cost of maintaining the roads and associated elements of the transportation system?
13. Do industries place special demands on the transportation system?
14. How many buses are there in the city bus fleet?
15. How many miles of route are covered by the public transportation system?
16. What is the average waiting time for buses?
17. How many taxi cabs serve the community?
18. Are bicycle paths provided?
19. What are the annual operating expenditures of the system?
20. What capital expenditures, if any, are there?
21. What is the annual debt service on bond issues?
22. What is the schedule of payments for debt service?

TRANSPORTATION

I. General Approach

Transportation systems include a wide variety of services provided by local and county governments. They generally fall into three major areas -- mass transit systems provided by local governments, systems supporting transit by car within a community and between communities, and pedestrian transit systems provided by local governments.

Local mass transit includes buses and taxi cabs. The chief service is to link downtown business areas with residential neighborhoods. Demand for bus service can be measured by the maximum expected number of passengers during the peak hour of operation along each of the major transportation routes. The equivalent capacity measure will be the number of passengers that can be transported along each of the major transportation routes during the peak hour of operation. (When measuring capacity, the planner should recognize that capacity along different routes may be altered by changing bus route/configurations, or by commuter transferring from one route to another.) There are no demand or capacity figures for taxi cabs because taxi services are typically provided in an economic market which tends to adjust automatically to changes in demand. The measures for buses and taxi cabs are shown on the IPO chart for mass transit.

BLM actions will affect community mass transit only indirectly, by causing population increases which in turn place additional demands on the mass transit system.

Systems which support car transit include roads, signal lights, street lighting, parking,[1] and snow removal equipment. Local and county[2] systems serve different needs and will be treated separately. Usually signal and street lights are not relevant components of county car transit systems. Demand for roads can be measured by the number of vehicles expected to travel along each major transportation route during the peak hour of operation. Capacity can be determined from the design flow rate on these roads. The number of key intersections where significant traffic interaction occurs can be used to measure the demand for signal lights. The amount of paved road, street lighting, parking and snow removal equipment can be evaluated using local community attitudes and standards based on the capacity for a given population.

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[1] Only parking data for the community's central business district is necessary, since this is where parking demands are centered.

[2] "County" systems support transit within the county. Some of these roads will actually be state-maintained roads.

BLM actions which encourage economic growth can affect the transportation system in a number of important ways. Industrial development may lead to greater use of roads by heavy commercial vehicles. This may necessitate upgrades in road quality and higher operating budgets. New employment sites will increase the number of commuters and may lead to a large increase in traffic on a few major transportation routes. Finally, increased local population will cause an overall increase in road use along all the major transportation routes.

Pedestrian transit will be supported primarily with sidewalks along roads where foot and bike travel is expected. Capacity will be measured by the amount (length) of sidewalk available. Adequacy of capacity to meet demand can be determined by sampling community opinions on the subject. BLM actions which encourage economic development and increase populations may affect the demand for sidewalks.

II. Assumptions

It is not possible to describe elements of the transportation system using single, aggregated community measures. Each individual transportation route will have its own demand and capacity characteristics. In order to keep data collection requirements within reasonable limits, it will be very important to limit "major" transportation routes to a select group of the most important streets and roads.

The geographical area of interest for mass transit and pedestrian transit will be the municipality or town, since county and state governments do not provide such services. Both local and the county-wide car transit systems will be important, and data will need to be collected for both levels.

III. Standards

Standards can be used to compare an accepted measure of system adequacy with actual system performance. For mass transit systems, population/capacity ratios for comparable communities provide an understanding of the adequacy of the system. The percentage of bus capacity actually utilized provides another relevant measure. The presumed standard is that utilization not exceed 100 percent. Even with efficiently laid out bus routes, there will be some residential areas which will not be adequately served. No national or state criteria exist for the portion of houses within a community that should be served, since locational factors and community preferences will cause route configurations to differ from community to community. However, data on the fraction of houses served will provide a general understanding of the role of mass transit in the community.

There are few formal standards for car transit systems that are relevant to measuring the adequacy of the system's capacity. The adequacy of road capacity is based on the percent of utilized capacity. The presumed

standard is 100 percent, although few city road systems operate without at least occasionally exceeding the designed road capacity. The adequacy of signal light placement is similarly measured by comparing the number of signal lights with the number of intersections needing signal lights. The presumed standard is of course that all intersections needing signal lights have them. The adequacy of roads serving major industries will need to be assessed on a case-by-case basis. Uniform standards do not exist for either the amount of road that should be paved or the allowable length of time during which roads should be cleared after snowstorms, but local field surveys can be used to gain an understanding of the perceived adequacy of these elements. Finally, a standard for the number of parking spaces in the community central business district can be developed based on data gathered about communities of similar size.

Pedestrian transit systems (primarily sidewalks) are assessed by measuring the portion of community roads which provide for pedestrian transit. Adequacy can be measured from community attitudes collected in local field surveys.

TRANSPORTATION: Mass Transit

Geographic Area: Incorporated Area, County for Unincorporated Areas

Source Number	INPUT	PROCESS	OUTPUT
1	Number of buses	→	Number of buses
1	Bus capacity	→	Bus capacity
1	Housing units served by buses	→	Housing units served by buses
1	Frequency of bus service	→	Frequency of bus service
1	Number of taxi cabs	→	Number of taxi cabs
2	Passenger railroads	→	Passenger railroads
3, 4	Air transit	→	Air transit
5	Regional bus transit	→	Regional bus transit
1	Operating budget	→	Operating budget
0	Number of buses	Population ÷ number of buses	Population per bus ratio
0	Bus capacity		
0	Population		
6	Population per bus standard		Population per bus standard
0	Bus capacity	Peak hour demand (bus capacity x frequency of bus service)	Fraction of bus capacity utilized (for each major transportation route)
0	Frequency of bus service		
1	Peak hour demand (for each major transportation route)		
0	Housing units served by bus service	Housing units served by bus service ÷ housing units	Fraction of housing units served by bus system
0	Housing units		

Geographic Area: Incorporated Area, County for Unincorporated Areas

Source Number	INPUT	PROCESS	OUTPUT
0	Number of taxi cabs	Population ÷ number of taxi cabs	Population per taxi cab
0	Population		
6	Standard for population per taxi cab		Standard for population per taxi cab
7	Annual operating expenditures	→	Annual operating expenditures
7	Capital expenditures	→	Capital expenditures
7	Annual debt service	→	Annual debt service

TRANSPORTATION: Mass Transit

Sources

1. Primary contact with a representative from the community bus system or a local government administrator responsible for overseeing operation of the bus system.

2. Primary contact with railroad company officials. (Railroads serving the region will be in local telephone directories.)

3. U.S. Department of Transportation, Federal Aviation Administration, Airport Activity Statistics (semi-annually), and National Airport Plan (annual).

4. U.S. Department of Interior, Bureau of Land Management, Surface Management Maps, 1/2 inch = 1 mile scale.

5. Primary contact with intercity bus company officials. (Bus companies serving the region will be in local telephone directories.)

6. Comparison with similarly sized communities.

7. Local budget.

0. System output.

TRANSPORTATION: Car Transit

Geographic Area: Incorporated Area, County for Unincorporated Areas
* indicates the necessity to locate on a map.

Source Number	INPUT	PROCESS	OUTPUT
1	Major transportation routes	* →	Major transportation routes
1	Miles of paved road	→	Miles of paved road
1	Miles of unpaved road	→	Miles of unpaved road
1	Miles of street lighting	→	Miles of street lighting
1	Design car flow rate (for each major transportation route	→	Design car flow rate (for each major transportation route
1	Peak hourly transportation demand (for each major transportation route)	→	Peak hourly transportation demand (for each major transportation route)
1	Number of signal lights	→	Number of signal lights
1	Number of key intersections	→	Number of key intersections
1	Number of parking spaces in central business district	→	Number of parking spaces in central business district
1	Number of snow removal plows	→	Number of snow removal plows
1	Road department personnel	→	Road department personnel
1	Operating budget	→	Operating budget
0 0 0	Design car flow rate Major transportation routes Peak hourly transportation demand	Peak hourly transportation demand ÷ design car flow rate (for each major transportation route)	Percent utilization of transportation routes during peak hours

TRANSPORTATION: Car Transit (cont.)

Geographic Area: Incorporated Area, County for Unincorporated Areas.

Source Number	INPUT	PROCESS	OUTPUT
0	Miles of paved road	Are roads able to meet industry transportation requirements?	Adequacy of roads serving industry
0	Miles of unpaved road		
0	Major transportation routes		
1, 2	Industry transportation requirements		
0	Miles of paved road	Miles of paved road ÷ (miles of paved road + miles of unpaved road)	Fraction of total road which is paved
0	Miles of unpaved road		
3	Local attitudes concerning paving requirements		Local attitudes concerning paving requirements
0	Number of signal lights	Number of signal lights ÷ number of "key" intersections	Fraction of needed signal lights now in place
0	Number of "key" intersections		
0	Number of parking spaces in central business district	Number of parking spaces in central business district x 1,000 ÷ population	Parking spaces per thousand population
0	Population		
4	Standard for number of parking spaces per thousand population		Standard for number of parking spaces per thousand population
0	Number of snow removal plows	(miles of paved road + miles of unpaved road) ÷ (number of snow removal plows x travel speed when plowing)	Time needed to clear roads
1	Travel speed when plowing		
0	Miles of paved road		
0	Miles of unpaved road		
1, 5	Community attitudes regarding time required to clear community roads	→	Community attitudes regarding time required to clear community roads
6	Annual operating expenditures	→	Annual operating expenditures
6	Capital expenditures	→	Capital expenditures
6	Annual debt service on bond issues	→	Annual debt service on bond issues

TRANSPORTATION: Car Transit

Sources

1. Primary contact with representatives from:

   1) the local road department or public works department, and
   2) the county road department or planning commission.

2. Primary contact with representatives from new industries with major expansion plans in the local area.

3. Field survey

4. Data from comparable communities. For example:

   Highway Research Board, Parking, Bulletin 19, 1949, pg. 39-40.

5. Field survey.

6. Local budget.

0. System output.

TRANSPORTATION: Pedestrian Transit

Geographic Area: Incorporated Area, County for Unincorporated Areas

Source Number	INPUT	PROCESS	OUTPUT
1	Miles of sidewalks	→	Miles of sidewalks
1	Operating budget	→	Operating budget
0	Miles of sidewalks	(miles of sidewalks ÷ 2) ÷ (miles of paved road + miles of unpayed road)	Fraction of roads with sidewalks
0	Miles of paved road		
0	Miles of unpaved road		
2	Local attitudes about the amount of sidewalks	→	Local attitudes about the amount of sidewalks
3	Annual operating expenditures	→	Annual operating expenditures
3	Capital expenditures	→	Capital expenditures
3	Annual debt service	→	Annual debt service

TRANSPORTATION: Pedestrian Transit

Sources

1. Primary contact with a representative from the local road department or public works department or an administrator from the local government.

2. Field survey.

3. Local budget.

0. System output.

XVI. WASTEWATER TREATMENT

CATEGORY: WASTEWATER TREATMENT

Systems which remove (and treat) municipal and industrial wastewater from the community.

Subcategory: Wastewater Collection

Systems which collect sewage (wastewater) from point sources within the community and convey it to treatment facilities or disposal areas.

- collection pipes	(gallons per day collection flow rat (possible hook-ups with existing tru lines) (gallons per day infiltration)
- operating budget	(dollars per year)

Subcategory: Treatment Facilities

Facilities for the treatment of municipal and industrial sewage, where collected from a community collection system.

- treatment facility	(gallons per day treatment rate) (treatment type)
- packaged systems	(housing units served) (treatment type)
- personnel	(number of employees) (skill levels)
- operating budget	(dollars per year)

CATEGORY: WASTEWATER TREATMENT

Subcategories: Wastewater Collection, Treatment Facilities

1. Is there a community (or "Regional") treatment facility?
2. What is the capacity of the treatment facility?
3. Does treated effluent meet water quality standards?
4. Does stormwater infiltration cause treatment facility overflow?
5. What percentage of units are served by the system(s)?
6. What is the daily sewage inflow rate?
7. What is the per capita amount of sewage produced?
8. Would new housing units require new trunk lines?
9. What is the capacity of the collection system?
10. What are the annual operating expenditures of the system?
11. What capital expenditures are there?
12. What is the annual debt service on bond issues?
13. What is the schedule of payments for debt services?

WASTEWATER TREATMENT

I. General Approach

There are two important components in the wastewater treatment system: the wastewater collection system which includes hook-ups from houses within the community, feeder pipelines and sewer mains which convey wastewater to a treatment facility; and the treatment facility, which processes the wastewater using a variety of treatment methods and then releases the resulting effluent into a stream or other disposal area. Some communities do not have treatment facilities and others provide only primary treatment.[1] Federal law requires that by 1983 communities perform at least secondary treatment.

BLM actions are unlikely to have any direct impact on community wastewater treatment needs. Where BLM actions encourage local economic growth, community population will increase, placing greater demands on the wastewater treatment and collection system. In addition, the introduction of different industrial activities may require more advanced or specialized treatment processes.

The key variables of a community wastewater treatment system are presented as inputs on the IPO charts. Demand variables measure the amount of wastewater produced within the community. Capacity (supply) variables measure the amount of wastewater which the system is normally capable of handling. The remaining inputs describe relevant community characteristics and the standards by which adequacy can be measured. The processes described relate changes in the key variables to changes in a community's ability to provide adequate wastewater treatment. Finally, outputs relate these changes to applicable standards.

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[1] Treatment consists primarily of removing matter which would decay in the environment and affect local ecosystems. The amount of this matter is measured by its biological oxygen demand (BOD) -- the amount of oxygen that would be consumed as the matter decomposes. Primary treatment filters solid matter from the wastewater and allows it to decay into a sludge which can be decomposed. Secondary treatment subjects the liquid component remaining after primary treatment to aeration or other techniques that further reduce the BOD of the wastewater. Advanced treatment methods go beyond secondary methods and can be so complete that the treated effluent meets drinking water standards.

Wastewater flows are roughly equal to the quantity of water supplied to the community. Storms, however, cause rainwater seepage into the wastewater collection system (infiltration) and can significantly increase the demands on the system. Community demands are normally expressed in terms of the stormwater infiltration rate and the peak wastewater production rate. The type of treatment employed will be determined by federal and state requirements.

Capacity of the wastewater treatment system is determined by its design treatment rate. Since untreated wastewater cannot be stored, the treatment facility must be capable of meeting the peak demand. If the flow rate through the treatment facility exceeds the design rate, treatment quality will be lessened. When large flows occur, such as during heavy storms, some systems bypass the treatment facility and release untreated wastewater.

II. Assumptions

The geographical area relevant to data collection is the local jurisdiction. Few residents within such a jurisdiction are not served by the wastewater treatment system and few residents outside it are served. However, the BLM analyst should be aware of annexations which may cause misleading shifts in wastewater treatment data.

The BLM analyst should also be aware of any wastewater treatment problems occurring outside the scope of a community treatment system. Chief among these is wastewater which has become either a source of pollution or a health hazard. This is most likely to occur either from the improper operation of individual septic systems, (a common form of treatment in rural areas) from nonpoint source discharges from farms, industries and urban areas.

Stormwater infiltration problems may create a need for the large treatment facilities necessary for handling peak periods. One alternative which the BLM analyst should be aware of is the replacement or repair of the existing wastewater collection system. The choice will depend primarily on an analysis of the costs of the various alternatives.

III. Standards

Standards for treatment facilities are generally set at the local level because of varying stormwater infiltration rates and per capita sewer production rates among different communities. Peak per capita wastewater production standards are found in federal guidelines, or in recommendations from the Office of the State Engineer.

The fraction of the collection and treatment system capacity utilized indicates how much wastewater production can increase before new facilities are needed. The presumed capacity standard utilization is 100 percent.

The availability of undeveloped housing sites within the community served by the existing water distribution network will define the growth that can take place in the community. This potential growth is measured by comparing the potential number of residential hook-ups with the number of residential housing units in the community. The presumed standard is, of course, one hook-up per house.

Standards for the level of treatment required in wastewater treatment facilities are established by PL 92-500, the Federal Water Pollution Control Act Amendments.

WASTEWATER TREATMENT: Wastewater Collection

Geographic Area: Incorporated Area, County for Unincorporated Areas

* indicates the necessity to locate on a map.

Source Number	INPUT	PROCESS	OUTPUT
1	Maximum collection rate	→	Maximum collection rate
2	Potential hook-ups with existing trunk lines	* →	Potential hook-ups with existing trunk lines
1	Storm water infiltration rate	→	Storm water infiltration rate
1	Peak community sewage production rate	→	Peak community sewage production rate
3	Operating budget	→	Operating budget
0	Peak community sewage production rate	(Peak community sewage production rate + storm water infiltration rate) ÷ maximum collection rate	Fraction of collection system capacity utilization
0	Storm water infiltration rate		
0	Maximum collection rate		
0	Peak community sewage production rate	(Peak community sewage production rate + storm water infiltration rate) ÷ population	Peak community per capita sewage production
0	Population		
2, 4, 5	Per capita sewage production design standard		Per capita sewage production design standard
0	Potential residential hook-ups with existing trunk lines	Potential residential hook-ups to existing trunk lines ÷ residential housing units	Capacity of trunk lines to serve new housing units
0	Residential housing units		

WASTEWATER TREATMENT: Wastewater Collection

Sources

1. Primary contact with representatives from the local agency responsible for the wastewater treatment facility will be the major source of data. However, studies are often available which obviate the need for contacting each community. Possible sources which may compile this information are:
   - The state agency responsible for water quality
   - Federal agency environmental impact statements
   - Regional EPA 208 offices

2. Primary contact with representatives from the local agency responsible for the wastewater treatment facility.

3. Primary contact with the community's town clerk or other official.

4. Primary contact with, or published standards from, the state engineer's office. Large communities are likely to have their own published standards which supercede state-recommended standards.

5. Merritt, Frederick S., ed., Standard Handbook for Civil Engineers, McGraw-Hill, 1968, pg. 22-3. (Revised periodically).

0. System output.

WASTEWATER TREATMENT: Treatment Facilities

Geographic Area: Incorporated Area, County for Unincorporated Areas
* indicates the necessity to locate on a map.
Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
1, 2	Design treatment rate	→	Design treatment rate
1, 2^a	Type of treatment facility (primary, secondary, advanced)	* →	Type of treatment facility (primary, secondary, advanced)
2	Number of employees	→	Number of employees
2	Number of skilled employees	→	Number of skilled employees
0	Peak community sewage production rate	Peak community sewage production rate ÷ design treatment rate	Fraction of treatment facility capacity utilized (normal conditions)
0	Design treatment rate		
0	Peak community sewage production	(Peak community sewage production + storm water infiltration rate) ÷ design treatment rate	Fraction of treatment facility capacity utilized (storm conditions)
0	Storm water infiltration rate		
0	Design treatment rate		
0	Type of treatment	Type of treatment ≥ EPA Water Quality Standard	Adequacy of treatment method
1	Water Quality Standard		

WASTEWATER TREATMENT: Treatment Facilities

Sources

1. Primary contact with, or published standards from, the regional EPA 208 agency.

2. Primary contact with representatives from the local agency responsible for the waste water treatment facility.

0. System output.

XVII. WATER SUPPLY

CATEGORY: WATER SUPPLY

Systems which provide water to a community for drinking and other municipal uses (e.g., firefighting, lawn irrigation).

Subcategory: Water Collection

Systems which collect water from sources such as wells, rivers, reservoirs or lakes for drinking and municipal uses and convey it to the community. Rivers, reservoirs and lakes often have associated water rights which limit the amount of water a community may draw annually. Similarly, there may be a maximum sustainable annual withdrawal rate from aquifers in the vicinity or community. Rivers have a summer flow which may constrain the rate at which water can be withdrawn.

- water sources	(gallons per day maximum sustainable withdrawal rate) (gallons per day during minimum flow) (acre feet per year water right)
- operating budget	(dollars per year)

Subcategory: Water Treatment

Systems which treat incoming water through chlorination, demineralization, etc., so that the outgoing water is suitable for domestic use. Operating personnel for the entire water supply system are included here.

- treatment facilities	(gallons per day treatment rate) (bacteria count per liter incoming) (bacteria count per liter outgoing) (milligrams per liter contamination incoming) (milligrams per liter contamination outgoing)
- operating personnel	(number of employees)
- operating budget	(dollars per year)

Subcategory: Water Storage

Systems which store treated water for municipal use.

- tanks	(gallons)
- operating budget	(dollars per year)

CATEGORY: WATER SUPPLY (cont.)

Subcategory: Water Distribution

Systems of pipes which distribute water within the community including pumping stations (not associated with storage tanks) and fire hydrant hook-ups.

- pipes	(PSIG minimum) (possible hook-ups with existing trunk lines) (gallons per day delivery rate)
- consumer billing	(number of employees)
- operating budget	(dollars per year)

CATEGORY: WATER SUPPLY

Subcategories: Water Distribution, Water Collection, Water Storage, Water Treatment

1. What is the quality of the water at the source?
2. What is the daily capacity of the source?
3. What is the delivery capacity of the system?
4. What is the daily per capita usage rate?
5. What is the summer peak demand for water?
6. What is the current excess capacity of the water supply system?
7. Would new housing require new trunk lines or just new hook-ups?
8. Is pressure adequate for firefighting?
9. Are aquifers, rivers, etc., subject to contamination?
10. Are there legal or institutional constraints to expanded source capacity (e.g., water rights)?
11. Are there physical constraints to expanded source (e.g., aquifer yields)?
12. How many trained treatment facility operators are available?
13. How many trained treatment facility operators are required for each facility?
14. How many people are served by wells not a part of the community water system?
15. How much treatment is needed to make incoming water acceptable for domestic use?
16. What is the capacity of water storage facilities?
17. What are the annual operating expenditures of the system?
18. What capital expenditures, if any, are there?
19. What is the annual debt service on bond issues?
20. What is the schedule of payments for debt service?

WATER SUPPLY

I. General Approach

Water supplied by community water supply systems passes through four major steps before it is used by a consumer. The water supply system begins by collecting water from sources such as wells, lakes, rivers, or underground wells and transferring it to the community. Most communities will draw on a single source which is relatively plentiful rather than a combination of these sources.

Water treatment plants are necessary in most communities because the water sources are contaminated with natural and man-made contaminants. These treatment plants use filters and settling tanks to remove suspended sediments and add chlorine gas to the water to kill harmful bacteria. Special techniques such as electrodialysis are occasionally used for special contamination problems such as water hardness (dissolved material salts) or toxic chemicals.

Treated water is transferred to a storage tank. This allows the water collection and treatment systems to operate at a uniform rate even though the water use rate may vary considerably during a typical day.

Finally, the water distribution system conveys water from the storage tank to consumers along an extensive network of trunklines, feeder pipelines, and hook-ups to individual homes.

BLM actions can affect community water supply systems in several significant ways. For instance, a coal mine may disturb aquifer recharge areas, lessening the sustainable yield of water from public wells, or grazing may cause erosion which increases the amount of sediments in the water source. A second and usually more significant effect comes when a BLM action encourages economic growth within an area. Increased local jobs will lead to population growth within the community, placing additional burdens on the water supply system.

The key variables which describe a community water supply system are presented in the Input column of the IPO charts. Capacity (supply) variables measure the amount and quality of water that the system is capable of providing. Demand variables measure the community demand for water. The remaining variables in the Input column describe relevant characteristics of the community and the standards by which adequacy can be measured. The Process column presents a method for relating changes in the key variables to changes in the quality of the water supply service provided by the community. Finally, the Output column relates these changes to applicable standards, criteria or norms.

Water demands within a community vary according to the time of day, reaching a peak in the early evenings. Daily demand will follow an annual cycle,

reaching a maximum during the hot summer months. Community water demands are typically expressed in terms of the average daily demand (the maximum demand over a 24-hour period) and the peak daily demand (the maximum demand over a one-hour period). Quality as well as quantity is demanded by water users, and types of contamination which reduce water potability are included on the IPO charts.

Capacity of the overall system will be determined by the portion of the system with the lowest capacity. The water distribution system will require a capacity large enough to handle peak daily demands. If water storage requirements are sufficient to average out the high and low demands that occur during each day, the water treatment and water collection systems will require a capacity large enough to handle average daily demand. Water quality needs will require a treatment system capable of reducing the concentration of contaminants to acceptable levels.

II. Assumptions

The geographical area relevant to data collection is the local community. Few residents within the community are not served by the water supply system and few residents outside the community are served. However, the planner should be aware of annexations which may cause misleading shifts in water supply system data.

Another important factor to be considered is the spill-over development that occurs outside the boundaries of rapidly growing communities. These developments have not been included as part of the infrastructure system since their inhabitants rely primarily on individual wells for drinking water. BLM actions which encourage growth in these areas or which affect aquifers that the wells use will affect these developments. Conversely, although the developments will not place demands on the community water supply system they may cause problems by interferring with community water sources.

Provision of sufficient water pressure and flow rate for firefighting may in some communities have a greater role in determining capacity than normal demands. The discussion of these needs is taken up in the section on Fire Protection.

III. Standards

Average and peak per capita daily water consumption design standards are usually set at the state level as part of a design manual for use by local communities. Considerable variations in water demand can exist between communities due to different climate, economic conditions and the composition (residential, industrial, commercial) of the community. Accordingly, comparisons between actual figures and the standards should be made with caution. In small communities the variations are more extreme, and average per capita consumptions as low as 60 gallons per day and as high as 1,000 gallons per day have been noted.[1] Based on a national average of 157 gallons

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[1] Centaur, unpublished data on water consumption in communities in the Eastern Powder River Basin of Wyoming, 1977. The former was a community of about 200 population with almost no municipal, industrial or commercial water users. The latter was a community of about 400 which operated a municipal golf course that required considerable watering.

per capita per day in 1965, the U.S. Water Resources Council has projected an average per capita consumption of 168 gallons per capita by the year 2000.

The fraction of capacity utilized for the water collection, water treatment and water distribution systems illustrates how greatly water demand can increase before new facilities are needed. The presumed standard for the amount of capacity utilized is less than 100 percent.

There is no national standard governing the size of water storage tanks, and state standards do not generally exist. A sufficient amount for small communities appears to be storage equivalent to one day's use. This provides an upper bound on what is necessary to handle daily fluctuations in demand with some margin should it be necessary to close the water treatment plant temporarily.

The availability of undeveloped housing sites within the community which are served by the existing water distribution network will limit the growth that can take place in the community. This is measured by comparing the potential number of residential hook-ups with the number of residential housing units in the community. The presumed standard is, of course, one hook-up per house.

The Environmental Protection Agency is responsible for promulgating drinking water standards under P.L. 93-523. Interim regulations were promulgated on July 9, 1976, superseding earlier standards published by the U.S. Public Health Service which were in widespread voluntary use. At the state level, standards are generally limited to bacterial contamination criteria set by the State Department of Health. Local attitudes towards water taste and appearance may create demands for treatment methods which reduce contaminant concentrations to well below the federal or state standards.

WATER SUPPLY: Water Collection

Geographic Area: County or Municipality

Source Number	INPUT	PROCESS	OUTPUT
1	Maximum sustainable daily withdrawal rate from source	→	Maximum sustainable daily withdrawal rate from source
1	Daily withdrawal rate from source during minimum flow periods	→	Daily withdrawal rate from source during minimum flow periods
1	Water rights from source	→	Water rights from source
1	Average daily community water usage	→	Average daily community water usage
0 0	Average daily community water usage Population	Average daily community water usage ÷ population	Local per capita average water usage
2	State per capita average daily water usage design criteria	→	State per capita average daily water usage design criteria
0 0	Average daily withdrawal rate from source during minimum flow periods Average daily community water usage	Average daily community water usage ÷ average withdrawal rate from source during minimum flow periods	Fraction of source capacity utilized
3	Annual operating expenditures	→	Annual operating expenditures
3	Annual capital expenditures	→	Annual capital expenditures
3	Annual debt service on bond issues	→	Annual debt service on bond issues

WATER SUPPLY: Water Collection

Sources

1. Primary contact with representatives from the local agency responsible for the water supply system will be the major source of data. However, studies are often available which obviate the need for contacting each community. Possible sources which may compile this information are:

   - The state agency responsible for water quality.
   - Federal agency environmental impact statements.
   - Regional EPA 208 offices.

2. Primary contact with, or published standards from, the State Engineer's Office. Large communities are likely to have their own published standards which supersede state-recommended standards.

3. Local budget.

O. System output.

WATER SUPPLY: Water Treatment

Geographic Area: County or Municipality
* Indicates the necessity to locate on a map.
Superscript "a" indicates items for which the year of construction or manufacture should be an input.

Source Number	INPUT	PROCESS	OUTPUT
1^a	Location of treatment facility	*	Location of treatment facility
1	Treatment rate	→	Treatment rate
1, 2	Bacterial contamination of incoming water	→	Bacterial contamination of incoming water
1, 2	Chemical contamination of incoming water	→	Chemical contamination of incoming water
1, 2	Bacterial contamination of outgoing water	→	Bacterial contamination of outgoing water
1, 2	Chemical contamination of outgoing water	→	Chemical contamination of outgoing water
1	Number of employees	→	Number of employees
0 0	Treatment rate Average daily community water usage	Average daily community water usage ÷ treatment rate	Fraction of treatment facility capacity utilized
0 2	Bacterial contamination of outgoing water State health standard for bacterial contamination	Bacterial contamination of outgoing water state health standard for bacterial contamination	Adequacy of treatment for bacterial contamination
0 2,3,4,5	Chemical contamination of outgoing water Standards for chemical contamination	Chemical contamination of outgoing water the standard	Adequacy (health) of treatment for chemical contamination
6	Local attitudes towards water quality	→	Adequacy (consumer preference) of treatment for chemical contamination

Geographic Area: County or Municipality

Source Number	INPUT	PROCESS	OUTPUT
7	Annual operating expenditures	→	Annual operating expenditures
7	Annual capital expenditures	→	Annual capital expenditures
7	Annual debt service on bond issues	→	Annual debt service on bond issues

WATER SUPPLY: Water Treatment

Sources

1. Primary contact with representatives from the local agency responsible for the water supply system.

2. Primary contact with, or published data from, the state department of health.

3. U.S. Environmental Protection Agency, "National Interim Drinking Water Standards," Federal Register, July 9, 1976.

4. U.S. Environmental Protection Agency, Quality Criteria for Water (Pre-Publication Copy), 1976

5. U.S. Environmental Protection Agency, "Drinking Water and Health: Recommendations of the National Academy of Sciences," Federal Register, July 11, 1977.

6. Field survey of local residents.

7. Local budget.

O. System output.

WATER SUPPLY: Water Storage

Geographic Area: County or municipality

Source Number	INPUT	PROCESS	OUTPUT
1	Quantity stored	→	Quantity stored
0 0	Quantity stored Average daily community water usage	Quantity stored ÷ Average daily community water usage	Number of days' usage stored
2	Standard for number of days' usage stored	→	Standard for number of days' usage stored
3	Annual operating expenditures	→	Annual operating expenditures
3	Annual capital expenditures	→	Annual capital expenditures
3	Annual debt service payments	→	Annual debt service payments

WATER SUPPLY: Water Storage

Sources

1. Primary contact with representatives from the local agency responsible for the water supply system.

2. No national or state standard has been identified. Unpublished Centaur data for small communities in the Eastern Powder River Basin shows actual storage capacity to be about one day's average water use.

3. Local budget.

4. System output.

WATER SUPPLY: Water Distribution

Geographic Area: County or Municipality

Source Number	INPUT	PROCESS	OUTPUT
1	Minimum system pressure	→	Minimum system pressure
1	Potential residential hook-ups to existing trunk lines	→	Potential residential hook-ups to existing trunk lines
1	Maximum delivery rate (system)	→	Maximum delivery rate (system)
1	Number of employees for consumer billing	→	Number of employees for consumer billing
0 0	Maximum delivery rate (system) Peak daily community water usage	Peak daily community water usage ÷ maximum delivery rate (system)	Percent utilization of distribution system capacity
0 0	Potential residential hook-ups to existing trunk lines Residential housing units	Potential residential hook-ups to existing trunk lines ÷ residential housing units	Capacity of trunk lines to serve new housing units
2	Annual operating expenditures	→	Annual operating expenditures
2	Annual capital expenditures	→	Annual capital expenditures
2	Annual debt service payments	→	Annual debt service payments

WATER SUPPLY: Water Distribution

Sources

1. Primary contact with representatives from the local agency responsible for the water supply system.

2. Local budget

O. System output.

XVIII. BIBLIOGRAPHY

BIBLIOGRAPHY

This bibliography contains references for sources of standards to be used in evaluating infrastructure systems.

General Sources

1. American Institute of Planners, 1776 Massachusetts Avenue, N.W., Washington, D.C. 20036.

2. American Society of Planning Officials, 1313 East 60 Street, Chicago, Illinois 60637, (312) 947-2560.

3. Goodman, William I. and Freund, Eric C., Principles and Practice of Urban Planning. International City Managers' Association, Washington, D.C., 1968.

4. Planning Environmental International, Interim Guide for Environmental Assessments, prepared for the Office of Policy Development and Research, U.S. Department of Housing and Urban Development, June, 1975.

5. International City Managers' Association, 1140 Connecticut Avenue, N.W., Washington, D.C. 20036.

6. Merrit, Frederick S., ed., Standard Handbook for Civil Engineers, McGraw-Hill, 1968 (periodically updated). Includes primarily design standards, but does reference many sources of performance standards and current national rates. Provides a good overview of those portions of community infrastructure of relevance to civil engineers.

Sources by Infrastructure Category

COMMUNICATIONS

1. None applicable.

2. For local phone service (excluded from category) use national averages for phones/1,000 pop.

EDUCATION

1. National Center for Educational Statistics, Washington, D.C., will make available, on request, its unpublished statistics on Historical

EDUCATION (cont.)

and current nationwide pupil/teacher ratios.

2. Local School District/State Department of Education in some areas may set standards for pupil/teacher ratios.

3. American Library Association, Subcommittee on Standards for Small Libraries, Interim Standards for Small Public Libraries, Guidelines Toward Achieving the Goals of Public Library Service, Chicago, 1962.

ENERGY SERVICES

None applicable.

FIRE PROTECTION

1. American Insurance Association, Standard Schedule for Cities and Towns of the United States with Reference to their Fire Defenses, New York, updated periodically.

FISCAL BASE

None applicable.

GOVERNMENT

None applicable.

HEALTH CARE

1. Health Systems Plan by State Health Systems Agency or Department of Health. These plans provide guidelines on bed/population and physician/population ratios. Current average ratios should also be available from this source.

2. Health Care Financing Administration, Division of Field Operations, Health Standards and Quality Bureau, Room 300, East Building, 6401 Security Blvd., Baltimore, Maryland. For national long-term care bed/population averages.

3. American Hospital Association, Office of Research and Statistics, 840 N. Lake Shore Drive, Chicago, Illinois 60611. For national hospital bed/population averages.

4. American Medical Association, Distribution of Physicians (published annually), 535 N. Dearborn Street, Chicago, Illinois 60610. For state and national physician/population averages. Specialities not listed in this publication can be obtained through: Health Resources Administration, Bureau of Health Manpower, Manpower Analysis Branch, Room 4-41 Center Building, 3700 East-West Highway, Hyattsville, Maryland 20782.

LAW ENFORCEMENT

1. National Advisory Council on Criminal Justice Standards and Goals, Report of the National Advisory Council on Criminal Justice Standards and Goals, GPO. #0-557-053, Washington, D.C., 1974.

2. U.S. Law Enforcement Assistance Administration and U.S. Bureau of the Census, Expenditure and Employment Data for the Criminal Justice System, Washington, D.C., issued annually.

3. State Law Enforcement Agency should also be contacted to determine whether State sets standards or guidelines for law enforcement services.

PUBLIC HOUSING

There are no performance standards. Two sources outlining basic procedures for analysing the total housing market are:

1. "FHA Techniques of Housing Market Analysis," U.S. Department of Housing and Urban Development, published January 1970, reprinted and revised August 1970. The January 1970 edition includes an appendix on occupancy requirements for subsidized housing excluded from the August 1970 edition. The pamphlet is out of print, but is available at HUD field offices and larger libraries.

2. Regional Housing Planning: A Technical Guide, prepared by Hammer, Greene, Siler Associates, for the American Institute of Planners, March 1972.

RECREATION

1. National Recreation and Parks Association, Evaluation of Community Recreation: A Guide to Evaluation with Standards and Evaluation Criteria, 1965, gives standards for evaluating the need for and adequacy of public recreation facilities.

2. National Recreation and Parks Association, National Park, Recreation and Open Space Standards, 1970.

3. National Recreation and Parks Association, Outdoor Recreation Space Standards, September 1967, provides standards for the provision of outdoor recreation areas.

4. National Safety Council, Annual Accident Facts, Chicago, a compilation of statistical data on accidental injuries.

5. U.S. Department of the Interior, Bureau of Outdoor Recreation, Outdoor Recreation Space Standards, 1967, contains standards for the provision of outdoor recreation areas.

SEARCH AND RESCUE

None applicable.

SOCIAL SERVICES

1. State or County Department of Health and/or Social Services. For state standards on staff/child ratios in day care.

2. DHEW, Federal Interagency Day Care Requirements, #OHD-76-31081, September, 1968 (may be updated in 1978). For national standards on staff/child ratios in day care.

SOLID WASTE

None applicable.

STORM-WATER RUNOFF

1. Army Corps of Engineers, National Program of Inspection of Dams, five volumes, 1974. An inventory of the larger dams that was undertaken during 1972-1974 as a result of the Federal Dam Safety and Inspection Act of 1972. The inventory may be updated in the future.

2. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Plain Management Division. The Flood Plain Management Division can be contacted at (202) 426-1891 to identify a local source of 100-year flood plain maps.

TRANSPORTATION

1. Highway Research Board, Parking, Bulletin 19, 1949. Recent sources were not found. Primary data collection effort may be required to get up-to-date data.

2. U.S. Department of Interior, Bureau of Land Management, Surface Management Maps, ½ inch = 1 mile. These maps will show the location of prominent intercity transportation features including primary and secondary roads, rail lines and airports.

WASTE WATER TREATMENT

1. Merrit, Frederick S., ed., Standard Handbook for Civil Engineers, McGraw Hill, 1968, pg. 22-23. Presents data on expected levels of sewage produced per capita.

WATER SUPPLY

1. U.S. Environmental Protection Agency, "Drinking Water and Health: Recommendations of the National Academy of Sciences," Federal Register, July 11, 1977. Contains NAS findings which will be used by EPA in finalizing drinking water standards.

2. U.S. Environmental Protection Agency, "National Interim Drinking Water Standards," Federal Register, July 9, 1976. Contains interim standards for acceptable levels of contaminants in public drinking water pursuant to P.L. 93-523.

3. U.S. Environmental Protection Agency, Quality Criteria for Water, (Pre-Publication Copy), 1976. Contains information relevant to determining acceptable contamination levels in streams and rivers. Impacts of contamination on agriculture, the environment and public health.

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